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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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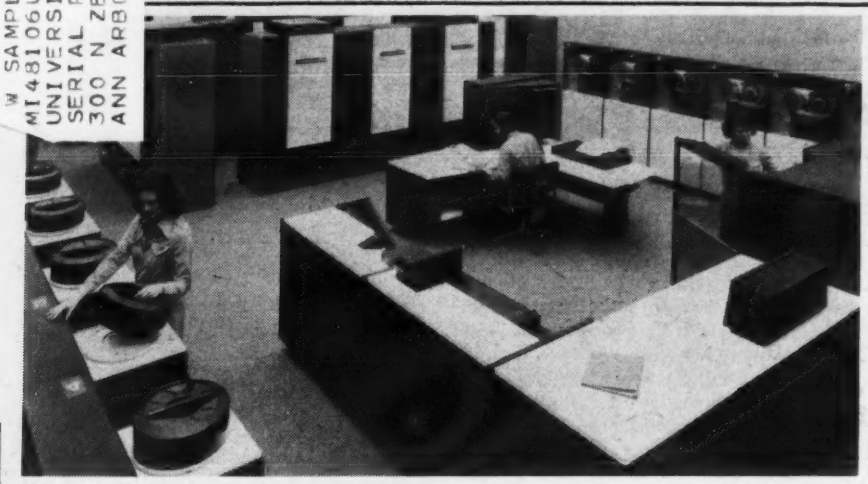

The Honeywell 68/80, the top of the Series 60 line, provides up to 6 billion bytes of addressable virtual memory.

Top to Bottom

The Honeywell 62/60, one of the smaller members of the new line, has memory capacity from 65K to 131K bytes.

11 Systems in Five Levels

Honeywell Series 60 Has Stamp of Compatibility

By Vic Farmer
Of the CW Staff

BILLERICA, Mass. – The age of the Honeywell hardware hodgepodge – inherited from the merger of GE computer operations nearly four years ago – is drawing to an end with the announcement of Honeywell's Series 60 line here last week.

Eleven computer systems are divided into five different "Levels" in the new line.

The systems all incorporate medium- and large-scale integrated (MSI and LSI) circuitry and metal oxide semiconductor random access memory which are now the standard state-of-the-art electronics design for nearly all computers.

But this new series, through the use of microprogrammable bridges and compatible versions of the Gcos Operating System, provides the basis of one compatible series of computers as well as compatibility or conversion aid from earlier systems.

Most of the peripherals for the system have been reworked to incorporate diagnostic routines that work in conjunction with the CPU to improve maintenance.

The peripherals include higher-speed line printers (up to 1,600 line/min), 200M byte/spindle-equivalent disk drives and 200 in./sec, 1,600 bit/in. tape drives), and these top-of-the-line peripherals will be available for the present 6000 Series users also.

Series 6000 Upgrades

The main thrust of last week's announcement centered on upgrades for the current 6000 Series of computers – the evolution of the General Electric 600 Series.

Five models, the 66/20, 66/40, 66/60, 66/80 and 68/80, are designed to offer logical upgrades for users of: large 2070s seeking communications capability (66/20); 6025 (66/40); 6040 (66/40); 6060 (66/80); 6080 (dual-processor 66/80s); and the 6180 (68/80).

The Level 66 systems offer multi-

(Continued on Page 2)

210 Page/Min Printer Also for 360/370

By a CW Staff Writer

BILLERICA, Mass. – In addition to its new systems, Honeywell also announced a treat last week for IBM 360/370 users as well as Honeywell systems.

The firm's new off-line, tape-driven electrostatic page printer prints up to 18K line/min (210 page/min) and will have utility software packages to support IBM 360 and 370 systems as well as Honeywell's Series 2000, 6000 and Level 66 systems.

The page printer incorporates a Honeywell 716 minicomputer and CRT console. Rolls of paper weighing 42 lbs can be printed and cut in variable lengths up to 14 inches long on the equipment.

Special metal format cylinders, priced at $330 each, can be used to preprint the forms with fixed information such as company logotypes or specially designed headings at no decrease in speed.

The basic configuration comes with eight collating pockets, but three additional stacks of eight pockets can be added to let the printer automatically collate 32 copies of a report up to 800 pages long.

Normal 14-inch-wide output is reduced and printed on the 11-inch-wide roll.

The standard print font consists of 96 characters, upper and lower case, and this permits printing of 132 characters across and 85 lines down on an 8-1/2 inch by 11-inch page. Up to 512 characters can be fixed on read only memory boards to allow multiple fonts using the 16 by 16 point/character matrix. Read-only tape drives handle standard 7- and 9-channel tape densities and recording formats.

The standard printer handles 140 page/minute (12,000 line/min) and monthly rental is charged on a rate per 1,000 feet of paper used. On a five-year contract, for example, the minimum rate will be $6.72/1,000 for the first 684,000 feet with a monthly minimum of $3,667.

For the higher-speed 210 page/min model, the rate would be $5.62/1,000 feet for the first 1,026,000 feet with a

(Continued on Page 2)

CIA Seeks New Standards Group, Tells Congress User Role a Must

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. – A new organization is needed for setting standards in the computer industry and it should include representatives of computer users, as well as the government and the industry, the Congress was told recently.

Such a federally chartered – and supported – organization could be completely neutral in developing standards needed in the industry and would not be dominated by any one large firm or group of firms, representatives from the Computer Industry Association told the House Subcommittee on Commerce and Finance.

Such an organization could therefore develop meaningful standards based on technical and application considerations, rather than marketing plans of any one company, the group indicated.

In addition, the CIA suggested that the National Bureau of Standards Institute of Computer Sciences "could be assigned responsibility to act as technical support and advisor" to the new group, "since both users and the smaller members in this industry lack extensive research and engineering capabilities."

Progress Limited

To date, "the achievements of private voluntary standards-making groups within our industry have been limited," Jack Biddle, CIA executive director, told the committee.

Before the U.S. can effectively participate in international standardization efforts, it first needs an effective domestic program, Biddle noted, indicating that "the standards development effort has been impeded rather than constructively pursued by some of the larger companies within our industry.

(Continued on Page 6)

FBI Must Erase Crime Records Of Not Guilty

By a CW Staff Writer

WASHINGTON, D.C. – The Federal Bureau of Investigation was ordered last week to remove anyone's arrest record from its criminal files (such as the computerized National Crime Information Center [NCIC]) if the arrested person was later exonerated of the charges.

The ruling, handed down by the Court of Appeals for the District of Columbia, would apparently force the FBI to take a more active role in assuring that disposition of cases be included with arrest records.

CCH Entry

In addition, it also will apparently prohibit the FBI from entering just arrest data into the Computerized Criminal History system that it operates as part of the NCIC.

Civil libertarians have argued for years that the FBI should not enter raw arrest data or criminal "rap sheets" into the computerized system, insisting that the FBI should only include information on

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Upgrade Options Same for Medium 200/2000 Users

By Ronald A. Frank
Of the CW Staff

BILLERICA, Mass. – After last week's introduction of Honeywell's long-awaited Series 60 equipment, the upgrade options available to most medium-scale 200/2000 users remain virtually unchanged.

The users with installed systems ranging from the 2020 to 2070 systems have yet to see new systems to move up to. These users now running under the Model 1 operating system can still go through the previously available upgrade path of moving into MSR 200 or OS/2000 software while acquiring a larger 2000 Series mainframe. A limited upgrade path would be for 2020 and 2030 Model 1 users to shift to the level by compatibility mode without reprogramming.

Ultimately these users can move into Level 66 Gcos which will be introduced in July 1975 and is slated to be the first implementation of "new" software. A compatibility mode on Level 66 will permit the user to run his 200/2000 programs. Earlier versions of Gcos will be unveiled with the Level 62 and Level 64 machines, but these are described as subsets of the Level 66 software. The 64/20 is a logical upgrade only for the smaller 200/2000 user and implies that other Level 64 machines will be added later.

Analysis

Significantly, the standardized software which Honeywell described as protecting the user, delves cautiously into a virtual operating mode. Most of the medium-scale systems will continue operating in a kind of "partial virtual mode" because current user experience with virtual systems indicates significant CPU overhead problems, according to a Honeywell spokesman.

Only on the Level 68 Gcos software can the user get "multidimensional processing" based on the Multics system and including segmentation, paging and memory mapping. But Levels 64 and 66 contain the necessary features for future upgrades to virtual mode features.

Most of the Series 60 software will be unbundled with only the operating system, job management and file systems, job control language and linking and debugging aids included with the basic system price. Separately priced will be language processors, utilities, program products, communications software and "advanced" job management and file systems.

About 43 applications programs were announced for use on the Series 60. Of these 19 were described as new with the rest existing packages that have been modified or enhanced. An example of the prices on these applications includes an inventory reporting system and bill of materials processor which will cost users $77/mo, and a production-scheduling control system for $179/mo. Part of this applications software will include existing packages running on the Series 60 in emulation mode at no charge to the user, a spokesman said.

Applications include banking, manufacturing, distribution, hospital and medical and general financial packages.

To "protect" users of purchased 6000 systems, Honeywell announced the GS6000 option which allows these systems to be upgraded to the "increased functionality" of Level 66 Gcos by providing the necessary hardware for $100,000.

In most Series 60 operating systems, the user has a hardware compatibility mode to run his programs originated on the earlier Honeywell system without reprogramming. For users with the capability to reprogram, a native Gcos mode will be available.

Specific comparisons of compatibility versus native operating mode include an example that a Level 64/20 user operating in H200 compatibility mode would have the processing power of a Honeywell 2030 system. The same user running in native mode on the 64/20 would have the power of a 2040 system. The conclusion to be drawn is that compatibility mode means about 30% degradation compared with operating in native mode, a spokesman said.

Prices for compatibility mode are $400/mo to allow G100 programs to run on a Level 64 machine, with the same price for H200/2000 system compatibility also on Level 64. Running in this mode would mean between "30% to 50% more throughput," a spokesman said, assuming that the move to a Series 60 system included a configuration upgrade.

Compatibility Stamps Series 60

(Continued from Page 1)

programming operating systems with dynamic memory allocations and reconfiguration, fail-soft operations, and they support concurrent local and remote batch-processing transaction processing, message-switching, time-sharing, interactive job entry and execution and online document entry, all using a common data base, according to Honeywell.

Up to four of the new 56- and 200-channel Datanet 6600 front-end processors can be connected per mainframe. Users also can integrate controllers and I/O multiplexers on the 66/20, 66/40 and 66/60.

IBM Comparison

The 66/20 and 66/40 are roughly competitive, according to Honeywell, with IBM's 370/145 and smaller 370/155s respectively and have a 1.4 μsec cycle time per eight bytes. Maximum memory on the 66/20 is 1M byte; 2M bytes on the 66/40.

Hardware prices range from $20,000/mo to $35,000/mo for the 66/20; $35,000/mo to $46,000/mo for the 66/40.

The 66/60 and 66/80 are roughly competitive, according to Honeywell, with IBM's 370/158 and 370/168 respectively and have a 4M byte memory limit and .75-μsec cycle time per eight bytes. No conversion is needed for users of Series 6000 or 600 systems, and Honeywell has conversion aids for its Model 400, G200, IBM's 360 and RCA Spectra systems.

Hardware prices of the 66/60 are $41,000/mo to $53,000/mo; and the 66/80 ranges from $53,000/mo to $102,000. Both the 66/60 and 66/80 use 512, 16-byte blocks of cache memory.

With equivalent configured systems the 66/40 has 1.7 times the power of the 66/20, the 66/60 has 1.6 times the power of the 66/40 and the 66/80 has 1.4 times the power of the 66/60, Honeywell said.

The largest of the systems is the Level 68/80 Multics-based system which can provide over 6G bytes of segmented virtual memory for each system user, and this memory can be extended up to the total capacity of the disks.

Ten 68/80s can even be tied together in a large communications-oriented system. Prices here start at $70,000/mo. Each processor can have a maximum of 8M bytes of memory.

At the lower end, Honeywell announced two smaller machines, the 62/60, claimed to be competitive with the IBM System/3/15; and the 64/20 which is somewhat comparable to the IBM 370/115.

Both of these lower-end machines use 8-bit bytes, instead of the 9-bit bytes of the Level 66 and 68 systems. Both have a maximum memory of 128K bytes although the 64/20 has twice as fast cycle time – 1 μsec for four bytes.

On the 62/60 Honeywell offers conversion aids for its Model 200 series and IBM's 360/20s for both programs and data files, in addition to an H100 conversion kit.

The 64/20 is designed as an upgrade for the low end of the H2000 series (2020 and 2030).

Firmware provides system verification, diagnostic and recovery features. Communications capabilities are integrated with up to six lines per system.

The 62/60 hardware prices range from $3,500/mo to $7,000/mo, and the 64/20 runs from $5,000/mo to $10,000/mo.

European Users

Four models were announced only for European users.

- 61/58 is an MOS memory version of the 58 system and uses Ansi 74 Cobol.
- 61/60 is a 61/58 with communications capability and is transaction-driven – a satellite-type system.
- 62/40 – billed as a logical upgrade to the Gamma 10.
- 64/40 – billed as a G130 replacement.

Honeywell's new 1,200 and 1,600 line/min printers use a hammer stroke against a flexible belt finger train which is packaged in a removable cartridge, and an option allows 160 print positions on normal 14-inch paper.

A DHU0800 document reader reads both optical characters as well as MICR and mark-sense input. The DHU0800, as well as a 200 in./sec tape drive and the 200M-byte per spindle disk drive will be available in the second quarter of 1975; the other systems and components will have first shipments late this year.

FBI Ordered to Expunge Files

(Continued from Page 1)

persons actually convicted of crimes.

The precedent-setting decision came when the court ruled that the FBI "had no authority to retain" the record of Dale B. Menard in its files.

Menard had been arrested in Los Angeles in 1965 on suspicion of burglary, but was never formally charged with the crime – but his fingerprint card, nevertheless, was forwarded to the FBI and his name entered into the computerized system.

Earlier, Judge Gerhard A. Gessell of the District Court here had ruled that the FBI must restrict the distribution of such files as Menard's but did not order the expungement of the record.

The new decision said, however, that "the FBI has the responsibility to expunge the incident from its criminal identification files."

All such records must be removed, the court said, "when the FBI is apprised that a person has been exonerated after initial arrest, released without charge," or when a record has been changed to indicate the individual was arrested just for detention.

The FBI cannot just act as a passive collector of information, the court added, indicating that by maintaining such records the FBI puts into the system "a capacity for both good and harm"; a move that will likely require the FBI to be more careful with its supervision of the collecting of arrest records.

The FBI estimated last week that up to 30% of its records could contain no disposition information, but other sources have indicated the total could run to 50% of the FBI's files.

The Justice Department said it would read the decision before deciding whether to appeal.

Printer Handles 210 Page/Min

(Continued from Page 1)

monthly minimum of $4,380. Maintenance is included for one-shift operation.

The 140 page/min printer is priced at $162,120 and the 210 page/min printer costs $193,620 outright. Rolls of paper 3,800 feet long are available in 8.5-inch or 11-inch widths and cost between $27 and $35 apiece.

The printers will be available by the end of the year.

What's 'In' in Fashion?

MONTREAL – A computer has a "vest"-ed interest in what happens to men's fashions this fall.

Peter Silverstone, president of Merit Clothing Co. Ltd. here, explained that since 1969 the company has been using a computer to help his design, production and marketing people foresee changes in fashion vogue – and he claims they haven't guessed wrong in those five years.

The rage of men's haberdasheries come autumn: vests and waistcoats for every possible occasion, he predicted.

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Controlling the EDP Environment

ADR Announces Enhanced Autoflow II System

PRINCETON, N.J.—Applied Data Research offers a new EDP approach to IBM 360/370 DOS and OS installations. AUTOFLOW II users can extend control, improve productivity, and optimize communications throughout the entire program/system development cycle.

Enhanced with exclusive systems-oriented facilities, this widely used software product has been transformed into a dynamic development tool. With scope extended to pre-coding and post-coding activities, the combined facilities of AUTOFLOW II offer a disciplined approach to total systems management.

These new dimensions of AUTOFLOW II span the entire system development cycle—from design through implementation, verification, and maintenance.

Benefits of the AUTOFLOW II environment include: comprehensive management review facilities; operational system support; accelerated development progress; control of programming resources; stabilized development procedures; and well-defined directions for all development tasks.

The total AUTOFLOW II environment is created and sustained through four unique options:

- *Module Analysis Processors (MAP)*—accept and analyze over 20 different source languages to produce extensive cross-referenced listings, summary analyses, and graphic charts focusing on various aspects of program activity and logic.
- *Cross-Program Auditor (CPA)*—examines and reports upon the characteristics of any number of input programs, across program boundaries, within the context of their functional interaction as a total system.
- *Extended Text Compositor (ETC)*—automates the preparation, composition, maintenance, and production of all forms of textual documentation.
- *Automated System Charter (ASC)*—automatically generates high-level system charts and reports, thus producing a panorama of job flow throughout an entire system. (This option will be available in mid-1974.)

Advanced Development Assistance

With these new facilities, AUTOFLOW II qualifies as an advanced development tool which can substantially reduce programming time and EDP costs.

ADR training aids, comprehensive documentation, and continual maintenance make AUTOFLOW II an efficient, easily used, and well-supported EDP asset. Automated error-reporting and distribution procedures expedite debugging and release of new product enhancements.

A variety of pricing plans (based on long-term, annual, or monthly charges) allows EDP management to select the most economical approach in furnishing AUTOFLOW II facilities tailored to an installation's unique requirements.

Versatile New Aid Analyzes Entire System Activity

PRINCETON, N.J.—A facility for the complete analysis of programs within an entire system further extends AUTOFLOW II's versatility.

This capability is provided by the new Cross-Program Auditor (CPA) option which permits integrated analysis of groups of program modules. CPA-generated reports can decrease the time and cost required to support applications systems, as well as increase the reliability of applications in a production status.

CPA reflects the latest advances in extending user control over ongoing system activity by providing analytical information on program inter-relationships and file organization.

Wide-Ranging Usefulness

By generating valuable analytical reports, CPA is a versatile program development aid with wide-ranging usefulness. CPA can simplify all maintenance activities, assist the data base administrator, forecast the scope of planned conversions and enhancements, monitor conformance to standards, and help in programmer training. CPA reports can also help meet the needs of auditors (either external or internal) by presenting comprehensive, highly structured reports of the often complicated interaction of programs within a system. Further, an auditor can selectively search for those names, structures, locations, etc., which are particularly relevant to the specific purpose of the audit.

Automated Text Composition with AutoFlow II

PRINCETON, N.J.—Automatic preparation and production of constantly changing narrative material—ranging from design specifications to policy manuals, internal documents, and final documentation for a project—are now available with AUTOFLOW II.

A new word processing option—The Extended Text Compositor (ETC)—dynamically extends AUTOFLOW II's graphic and narrative communication facilities. ETC simplifies the production and maintenance of all types of textual documentation.

Relieves Many Problems

ETC relieves the user of many common problems associated with documentation production. It allows preparation of a continuous data stream which will be composed automatically to produce pages of formatted text on a high-speed printer. Thus, all systems specifications and other narratives can be made available in hardcopy form when needed. Further, even when specifications change, all supporting documentation can be easily and immediately revised via convenient ETC updating commands.

The new word processing option handles line editing, line overflow, justification, and the proper dating of documents. ETC also provides an automatic table of contents facility and a comprehensive index generation capability. Through a facility analogous to the macro capability in Assembly languages, ETC can eliminate much repetitious data entry. ETC also enables entire sections of text to be conditionally included or omitted in the printed document.

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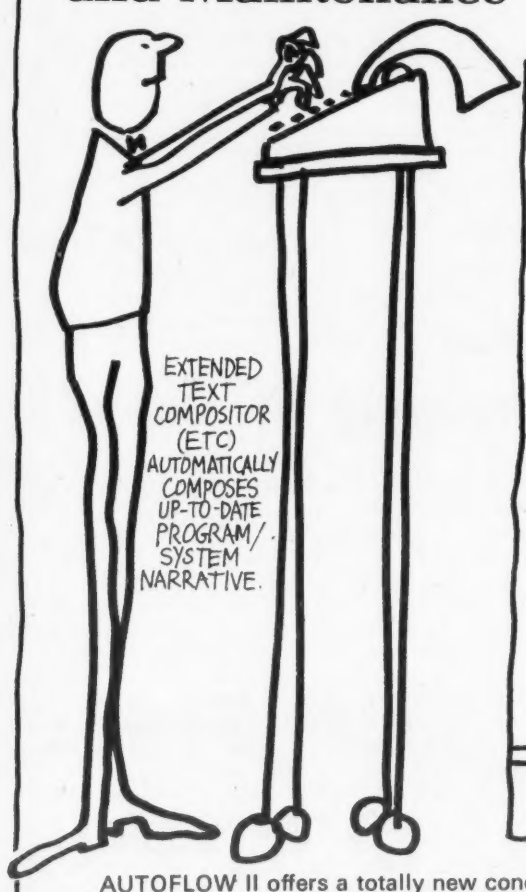

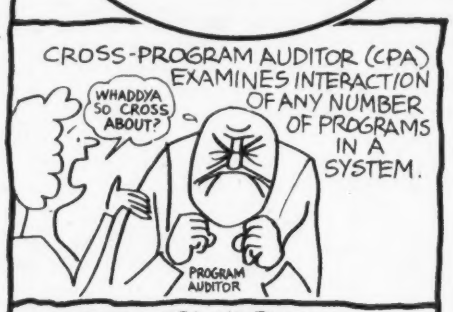

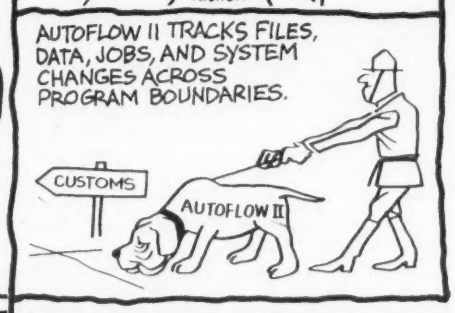

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Boy Scout Image Not Enough

What Makes Good Worker?

By Don Leavitt
Of the CW Staff

CHARLOTTE, N.C. – The Boy Scout qualities are no longer enough to make a good employee, or a good employer, according to John Ranking, operations manager for Data Processing of the South. Today, he told a Computer Caravan session here on personnel, there has to be a good job description, a predefined career path, and an agreement between employee and manager – in advance – on what is expected of each.

Preemployment screening is important, he noted, but setting the objectives of a job once the new employee is hired is even more vital if the employee is going to stay and be effective. And few companies can afford a lot of turnover or disgruntled employees.

The job description has to be in writing to avoid the possibility of misunderstandings and it must be divided into measureable components, Rankin stressed, so that both worker

Caravan/74

and boss can recognize strengths and weaknesses in the worker's performance.

The definition of a career path serves two purposes. It shows the employee that the company is planning ahead to utilize the perceived strengths, and that there is something beyond the immediate job, if the employee wants it.

A specified career path might also alert the worker to plans that really don't appeal to him or her, in time to change the plans before they become too hard and fast.

The biggest problem for managers, in Rankin's view, is knowing what to measure and how to measure it once it is identified. The concepts of management by objective are not particularly useful at the individual employee level, but a "critical incidents checklist" – developed at the University of Tennessee – adds objectivity to management's observations, he said.

Once the employee has been at work for some time, management owes him a review, but this need not be tied to a rigid time cycle or to situations that "demand" review – positively or negatively. They should be generally positive in tone, but the manager should not avoid the employee's weaknesses, Rankin said.

The review should be conversational and this can be fostered, he felt, by having the employee evaluate his own work before he meets with his manager. Less formal and more frequent reviews could give management a truer picture of ongoing situations and give the worker a sense that his superiors are interested in his work.

Any formal evaluation should be backed up by dollars, Rankin said, even if the salary adjustment isn't made at the time of the review. "Let the worker know you mean what you've said, in dollars and cents," he urged managers.

Terminals Deserve A+

Special to Computerworld

BOSTON – Intelligent terminals are getting an "A-plus" for helping prepare clean data in a study aimed at developing a federal program of rent subsidy, an alternative to public housing, according to Robert McLaughlin of Abt Associates, Cambridge.

Abt is conducting research for the Department of Housing and Urban Development based on pilot rent subsidy programs under way near Pittsburgh and Phoenix.

The HUD contract has two objectives, McLaughlin explained at a recent Caravan forum:

- "First, to process 35,000 monthly questionnaires containing 35 questions, and issuing to each participant in the program a check whose amount might vary from month to month depending on answers on those questionnaires.
- "Second, to build a large data base as documentation for a three- to five-year research project that would determine the final shape of a nationwide rent-subsidy program."

He said information gathered at two remote locations (Pittsburgh and Phoenix) is fed to a Wang Model 65 central processor in Cambridge.

Because of lack of time, McLaughlin said only two systems for data entry were seriously considered: the Datapoint 2700 and a comparable Sycor unit.

The Datapoint 2700 was chosen for three reasons:

- It had a stronger programming potential.
- Core was upward-expandable, allowing them to start with 8K, expand to 12K, and possibly even expand to 16K if necessary.
- An automatic dialer feature allowing transmission of data by telephone at night when rates are lowest and the staff is not working.

McLaughlin described the primary benefit of the Datapoint 2700 as "its ability to provide clean documentation at remote processing sites. Incorrect data is refused," he said, and operators simply return rent questionnaires that are incomplete or filled out incorrectly.

In any new system, McLaughlin advised, "you can't assume it's going to work 100% immediately." Startup took Abt from August to November.

Get That User Involved

By Molly Upton
Of the CW Staff

BOSTON – When developing a large applications program, "you should involve the user from the inception of the project through to completion," William Bell, vice-president of the Worcester County National Bank, believes.

At the bank, the user department, through a representative, participates from the beginning of the project, assists in preparation of the user manual and becomes the liaison for the DP and user department.

Gary B. Wirth, senior technical adviser at New England Electric System, suggested another variation of user involvement, noting he could tell some good "war stories" about incidents between user departments and the DP room.

However, things have changed and the responsibility for having a program run correctly rests with the using department. The computer room's philosophy is that it runs jobs on computers – period.

There is a user on every project development team, and the user has to sign off the system. In addition, a technical representative was assigned to various departments to educate them about the intricacies of programs and computers, "so now the user knows what we're talking about," he said.

In the Trust Division of the First National Bank, there are three parties involved in projects: the user, system development team and operations management, observed Wendell F. Jacques Jr., assistant vice-president and manager of planning and research at Old Colony Trust Division.

During development, the operations department sets the standards and the user department works with the systems group. Once the program is developed, the user deals with the operations department. Any changes involve the user and systems personnel.

The First has a priorities committee to determine which projects get attention when.

In a small business, Morris Carver, president of Atlas Paper Co., said he encourages "cross pollination" between the DP people and the other departments.

His shipping, credit manager, cashier and sales manager have each suggested applications for the firm's Basic Four after they understood how the system was set up, he said.

Keep Users Talking, Service Will Come

By Molly Upton
Of the CW Staff

BOSTON – Communicating your equipment problems with other users of similar equipment, and prospective users, can work wonders for prompt maintenance, Thomas Provost of MIT said in a Caravan workshop discussion on multivendor sites.

Other suggestions made by attendees to improve operations in such shops were to keep a detailed log of equipment problems; make multiple vendors feel it is "their" site; and become relatively proficient in pinpointing problems before calling for help.

Positive Reaction

Provost noted that when a vendor came to try to sell him equipment, he recounted how another user had been unable to get his gear fixed, so he really wasn't interested if that was the type of service offered.

The other user's equipment, which had been malfunctioning for over a week, was fixed the next day, he added.

Vendors put customers on their lists sometimes before the gear is unpacked, and they readily will give out names of other users to prospective customers, noted Jim Simpson, systems manager at the First National Bank of Boston.

So although one installation might not feel it has much clout with a vendor when it comes to maintenance, by keeping the lines of communication open with other users, this situation will change, Provost said.

Keeping a log of downtime and reruns will help the user know the next time what the problem is, explained Simpson.

At the First, problems are reviewed with the on-site engineer. "If you decide to become a multivendor site, it's this type of thing you'll have to do," he said.

Getting the vendors' personnel involved with the site, and establishing groundrules in advance, such as how the customer engineer is going to help the user prevent these problems, were other suggestions.

One user noted he had had good results by convincing both vendors that his site was not a mainframer's site or a peripheral maker's site, but rather "their site." He has received extensive cooperation from the service personnel of both firms, he noted. They come in at the same time and work together to find the solutions, rather than allocating responsibility to "the other guy."

Workshop leader Wendell F. Jacques Jr. said helping pinpoint the problem can save time and money. The Old Colony Trust Division of the First National Bank used Paradyne modems with error-detection facilities which helped convince the telephone company when it was at fault.

"We had very little trouble with the phone company once it was set up. We spent lots of time making sure it was right in the first place," he noted.

Jacques, assistant vice-president of management and planning for the Trust Division, has established a centralized reporting procedure when trouble occurs either with the system or with the Computek screens and Tektronix hard-copy devices used by bank officers.

Rather than pay for contract maintenance, for terminals, Jacques discovered that most of the trouble could be diagnosed over the phone and solved with a visit by himself or one of his staff, or even by talking with the terminal user.

Watch Out for the Creeping DP Costs!

By Edie Holmes
Of the CW Staff

BOSTON – "Your company should begin to investigate available mini-systems when the projected time-sharing costs for handling DP approach the dollars required to install an in-house minicomputer," Morris Carver of Atlas Paper Co. told a Caravan workshop here.

President of the small company with some 2,200 customers on its books and mailing out approximately 100 invoices a day, Carver said that any small, T/S user must anticipate increasing DP costs as his business expands.

Every new application means a jump in the T/S cost-curve, he noted. "Eventually, a company spends as much to invest in hardware and software as it does to stay with T/S," Carver said.

Atlas Paper Co. went to a Basic/4 configuration in 1972 after several years with T/S.

"Considering the dollar cost of the equipment, the lifetime of the equipment and the annual costs of interest, programming and supplies, we estimated monthly minicomputer expenses at less than half those of T/S. Even allowing for a 25% to 30% error in our figures, the in-house system still represented a savings," Carver commented.

He noted that entry into computers represented a risk for his company – the development of an in-house DP capability can make or break a small business.

Working with T/S, Atlas Paper Co. became more aware of its DP needs. For example, the company discovered it required more in the way of profit and pricing information per item.

Carver contended that many of his company's requirements are representative of the needs of small businesses shopping in the minicomputer market.

"Not only did we want to stay away from cards and tapes, but we wanted a flexible system with expansion capabilities," he said. "Because we wanted to use in-house personnel, we looked for a computer operating with a simple language."

Finally, Atlas Paper Co. desired a low-risk minicomputer in terms of practical obsolescence. "The system we have now may be technically obsolete, but our company is practically useful for another six years," Carver added.

To meet its needs, Atlas installed a Basic/4 system with two CRTs, one disk drive with two disk packs, one CPU and one medium-speed character printer. Efficient use of the system depends on the operator's understanding of how to partition the 16K of available memory, he said.

The system is further flexible because all small changes in a program are easily made, he said. "It's essential, however, that the person altering the program know what he or she is doing."

For this reason, he stressed the need for an experienced programmer. "We're small enough that we don't need a full-time programmer on the premises," Carver commented. "We do need an outside software specialist and an inside DP assistant who can communicate our programming needs to him. Not having good software support would be like not having the key to your car."

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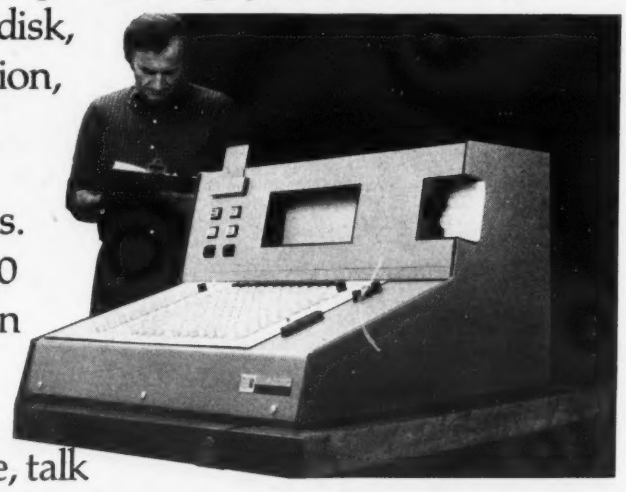

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U.S. Blames IBM 'Harassing' Tactics, Sees Trial Delay

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – Government lawyers last week charged IBM with "harassing" tactics that might lead to a delay in the starting date of the government's almost six-year-old antitrust suit against IBM.

Lead government attorney Raymond Carlson said that IBM was tying up the government's legal staff by filing a huge request for documents in the case and hinted that the Oct. 7 starting date might have to be delayed because of the moves.

However, Thomas Barr of Cravath, Swaine and Moore – the outside IBM attorneys, retorted with, "I have not asked for a delay and will not ask for a delay of this case. I want only the facts."

Barr charged that most government users disagree with the definitions of the computer industry that are being put forth by the Department of Justice and said it was extremely important for IBM to have those conflicting views on the record.

Judge David N. Edelstein, who was presiding at last week's pretrial hearing in the case, said he hoped the parties could work out the problems between them.

"I assure you," Edelstein warned both sides, "it is my firm intention, the good Lord willing, to go to trial Oct. 7."

But Carlson said "if the government's counsel spends all their time fighting brush fires, the matter of the government being ready for trial is increasingly difficult."

Edelstein suggested that the parties might have to take a good look at "where we are" in August or September in order to determine whether the Oct. 7 date was realistic at that point.

The government noted the IBM request for admissions in the case numbered over 7,000 separate items and that to answer one of them alone would require over 50,000 separate answers.

The Justice lawyers said they would probably admit to 75% to 80% of the requests, but they would have to clarify most of those since they were "skillfully worded" to reflect IBM's view of the market and the computer industry.

In other action during last week's pretrial:

- IBM said it would probably add another 100 witnesses to its witness list, which already numbers 194 people, while the government said it would keep the number of government witnesses at about 40, as it is presently.
- The government charged that IBM had resisted all government requests for a breakdown of installed IBM equipment on a systems basis. The IBM attorneys retorted that was almost an impossible request since installation information was maintained in IBM only on a box, not systems basis. The government said IBM had the information in a data base and could easily get a systems list – and indicated it would begin depositions of IBM personnel to prove its claim.
- Edelstein claimed he would hire an independent economic expert to help advise him on the issues in the case if both the government and IBM agreed to split the costs – IBM agreed immediately, while the government said it would have to get further clearance for the expenditure but could probably get it. The judge also said he might call in an accountant and a computer technology expert for advice in the case.
- Edelstein agreed with the government that it was improper for IBM to try to conduct informal interviews with personnel on the government witness list and said IBM would formally have to depose the people before talking with them.

New Standards Push 'Needs' User Role

(Continued from Page 1)

"In our industry, one company – an international cartel in its own right – has chosen to use its representatives on the standards bodies of many nations to impede the adoption of standards that would benefit the user and the industry," he charged.

The major company in the industry, he said, "sees standards as a major business policy problem and fears that their development may impact their control of the market and their subsequent profitability."

At the same time, "the ultimate beneficiary of standards is the user of the standardized product or service," said Norman J. Ream, director of standards development for the CIA.

But, he said, users have largely remained "dependent upon the industry for leadership and guidance" in the area of standards and "more specifically they are largely dependent upon a single full-line system supplier.

"This is particularly significant," Ream noted, "since most standards come into being as a result of the needs and desires of the buyer or consumer of the product," while users in the computer industry have remained "passive" with regard to standards.

"As a consequence, although many alternative products are available in the marketplace, the lack of standardization severely restricts the user's choice among alternatives," due to his investment in programs, data and operating systems.

At the present, he said, this results in a great deal of waste, since "an estimated 25% of the present computer power is used to provide systems compatibility."

Ream said that while several manufacturers "have publicly supported voluntary standards efforts," they have at the same time worked behind the scenes to "defeat or delay the adoption of standards that might impact their market position."

In the area of I/O standards alone, he noted, committees have worked on the subject for over 10 years, and have still been unable to produce anything at all.

Participation by users or other interested parties in this one effort alone "would have required an expenditure somewhere in the vicinity of $300,000 and the loss of availability of one or more highly qualified employees . . . and all to no avail," Ream said.

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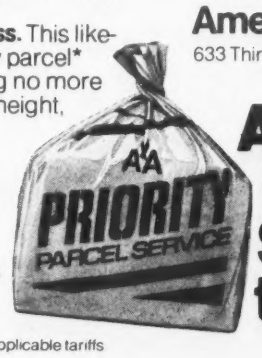

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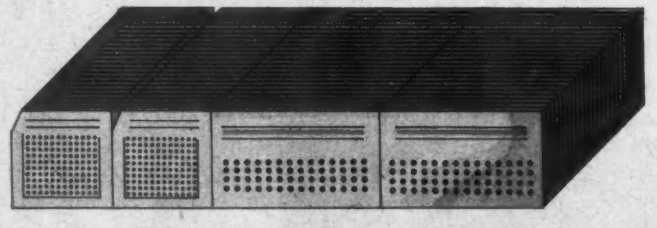

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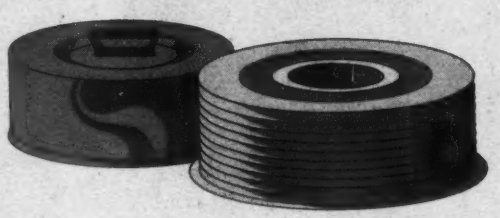

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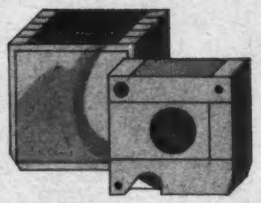

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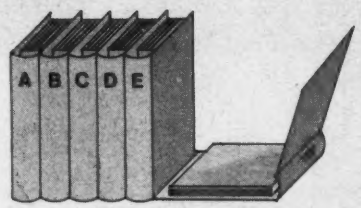

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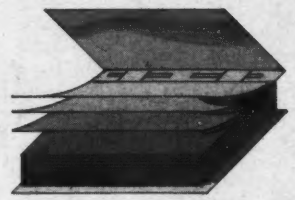

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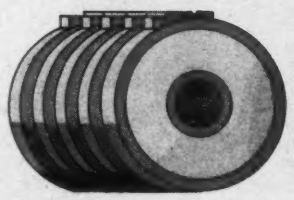

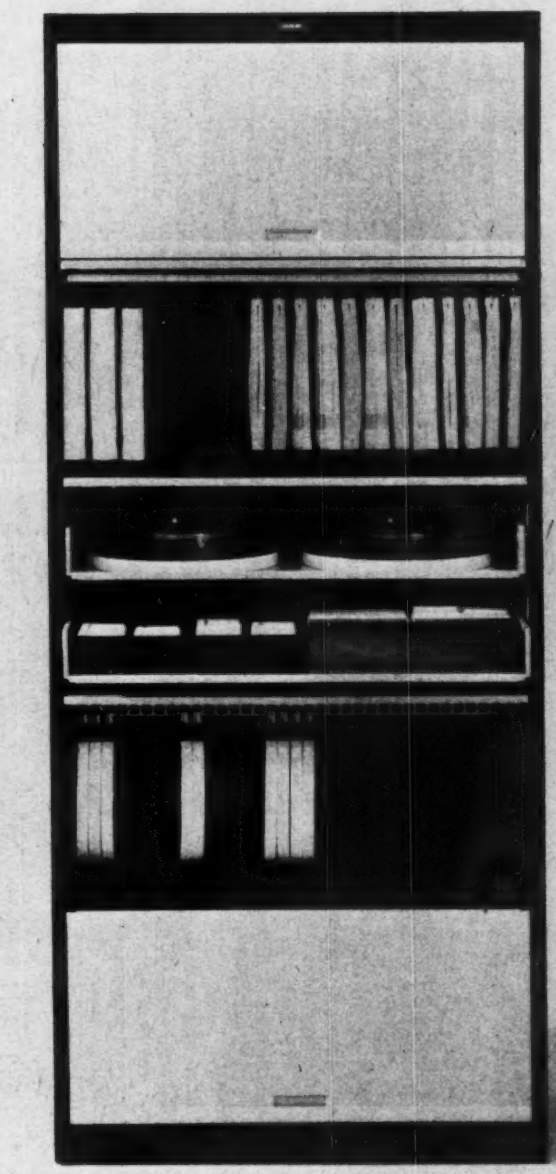

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Top-Notch Systems Man Vital

Hospital CICS Use Proves Vendor Packages 'Safest'

By Ronald A. Frank
Of the CW Staff

BOSTON – IBM's CICS teleprocessing monitor is a "very delicate package that needs a lot of massaging," and its implementation makes it absolutely necessary to have a top-notch systems man, according to Thomas M. Carr, assistant director at St. Vincent Hospital, Worcester, Mass.

Speaking at a Computer Carvan '74 session on on-line systems, Carr explained how CICS had been implemented at the hospital as part of a CRT-based data base application. The system now includes about 20 CRTs and 10 printers and the patient information data base in the IBM 370/135 handles about "68,000 accesses daily," he said. In addition to GTE terminal controllers, the hospital has a Memorex 1270 control unit.

Despite some of the difficulties with CICS, Carr said he would do it again if he had to. Users should "have some real misgivings about internal software development," he advised, adding that buying vendor packages "is usually the safest way."

Talking to other users has "extreme value," Carr said, explaining that he had consulted a hospital in Vermont that had implemented earlier many of the features that are now at St. Vincent. When talking to other users, be sure to find out the bad things and those features that the existing user would like to change, he advised.

The hospital went through an exhaustive terminal evaluation process before it selected GTE video display units. "You can look at vendors just so long and then you have to bite the bullet and pick one," Carr advised.

The GTE units were selected because of their competitive cost (about $118/mo) and also because they required relatively little space. The latter was an important consideration in hospital areas where space was at a premium, he said.

Almost all of the CRTs are in the hospital complex across the street from the DP center where the 135 is located, Carr explained. Initially he ordered 300 pairs of dedicated wire pair from the phone company with C-2 conditioning. But when he upgraded his terminals from 2,400 bit/sec to 4,800 bit/sec, the quality of transmission became more critical.

One way he found to reduce the increased noise at the higher speed was to install shielded wires, he said. "Every time the traffic lights in the street changed, we would get blips on the screens," Carr said. Another source of interference was traced to a generator in the hospital complex.

The St. Vincent on-line system operates 24 hours per day and it cannot be down. Some of the patient information is critical and a system failure cannot be tolerated, Carr said. One example is the pathology information often requested by surgeons before beginning an operation, he explained.

Many departments in the hospital want to be added to the data base system but many of them cannot justify the cost, Carr said. A hospital must consider whether the extra cost of equipment will shorten the stay of a patient or affect the quality of health care, and sometimes the equipment is not warranted, he said.

The system includes 17 major master files which print out "about 10,000 lines of print daily." The trade-off on whether to have simply a display or add a printer depends on what will be done with the information. "If the information must be carried away from the terminal, then a printer may be required," he said.

The system includes Centronic printers (about $130/mo) and in areas where silence is needed, thermal printers are used, Carr explained. One minor drawback with the thermal printers is that they are so quiet that often no one hears a message being printed out, he added. Paper for the thermal printers costs the hospital about one cent per page.

As part of the admissions application, the on-line system prints out a four-part form listing data on the patient. Included is a strip with the patient's name that is peeled off the printout paper and inserted into a plastic sleeve to become an ID bracelet, he explained.

Protection against unauthorized access to patient data is built in through the use of function keys and application codes, Carr said.

Roving Spacecraft Mean Traveling CPUs

CW West Coast Bureau

MOUNTAINVIEW, Calif. – Two interplanetary spacecraft – Pioneer 10 and 11 – are being controlled here by two Xerox Sigma 5 computers that also have a knack for getting around.

While neither computer has shown interplanetary aspirations, both love to travel.

Sitting now at the Nasa Ames data processing center at Moffett Field, both Sigma 5s are controlling the flights of the two spacecraft, one of which successfully encountered Jupiter's atmosphere last December. Pioneer 11 will approach Jupiter this December.

But in order to get both spacecraft functioning properly, the two Sigma 5s had to be transported from Redondo Beach, where TRW, the prime contractor for the missions, had set them up. From there they journeyed to Cape Kennedy to assist in the prelaunch activity in March 1972.

From there one of the Sigma 5s went to Nasa Ames to control Pioneer 10, while the other Sigma 5 returned to Redondo Beach until it was recalled to the Cape in February 1973 for the launch of Pioneer 11.

Then the second Sigma 5 was also shipped to Nasa Ames, where it sits beside its companion computer, which is still controlling Pioneer 10's thrust beyond Jupiter.

Manfred N. Wirth, data systems engineer at Nasa Ames, said: "There was very little difficulty moving the computers. There was some minimal damage done during dismantling at Cape Kennedy and some minimal vibration damage to both computers, but nothing of significance."

The computers were shipped by van, in pieces, and reinstalled for operation.

A TRW spokesman said on the first launch there was one problem with a CPU because of some loose printed circuit cards, but it was resolved easily.

Wirth said both Sigma 5s are doing real-time mission control of the spacecraft, gathering data of scientific interest and handling thousands of commands a week to the spacecraft.

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California Privacy, Confidentiality Guides Urge Universal Responsibility

By Marvin Smalheiser
CW West Coast Bureau

SACRAMENTO, Calif. – A broad range of guidelines establishing the requirements for security and confidentiality of information systems has been published by the state Intergovernmental Board on Electronic Data Processing.

The guidelines are set up as a comprehensive checklist for data processing managers, users of data systems and executives responsible for DP operations.

The Intergovernmental Board cited the need for "universal responsibility among those persons involved with private information to provide privacy and confidentiality.

"Whether they are computer users in the private or public sector, legislators or computer manufacturers," the board said, "all share an obligation to help shape the prudent, public policies that society will need for the years ahead. Technical programs by themselves cannot do the necessary job."

Whose Concern?

The guidelines state: "The security, data integrity and confidentiality issues are concerns of the computer system itself, the designers, the operational and maintenance personnel and the agency with control."

The guidelines cover privacy and confidentiality, physical security, data security, controls, audit and evaluation, insurance coverage and the question of how much privacy and security are needed.

In its policy statement, the board supported the following principles:

- Government agencies should collect only that information which is pertinent and necessary to the performance of their assigned responsibilities.
- Government agencies should limit access to information only to those who have a clear and authorized need for the information.
- Individuals have the right to know what information is being collected about them and for what purpose and to submit evidence to correct and complete the record.
- Public agencies have an obligation to establish and make known administrative and legal procedures for the review of individual records and the correction of inaccuracies in those records.

The single most important ingredient in physical security is termed adequately trained operating personnel and it is urged that the first consideration of contingency planning be people.

It is also urged that "additional emphasis should be placed on employee and internal sabotage or misuses of information."

Regarding insurance, the guidelines suggest that "it is much like developing the contingency plan itself, in that all aspects of potential loss must be considered and evaluated."

The Intergovernmental Board established the following criteria to evaluate privacy and security legislation:

- Does the bill strengthen the principle that government agencies should collect only that information which is pertinent and necessary to the performance of their assigned responsibilities?
- Does the bill emphasize the need to limit the access to information about individuals to only those with a clear and authorized need for the information?
- Does the bill advance the individual's right to know what agency is getting what data, what purpose the data is used for, to review information and to submit evidence to correct or complete the record?
- Does the bill establish or require the agency to establish the procedures by which information about individuals may be reviewed and corrected?
- Does the bill make adequate provision for making known to the public the administrative and legal procedures for the review and correction of errors in information about individuals?
- Does the bill promote consolidation of statutory provisions relating to privacy and security?
- Does the bill promote the physical security of DP installations and data in its form of storage and transmission?

The Intergovernmental Board is composed of policy-level people from state and local government, supported by DP people from industry and commerce in local committees.

Copies of the guidelines are available for $2 from the State of California, Documents Section, P.O. Box 20191, Sacramento, Calif. 95820.

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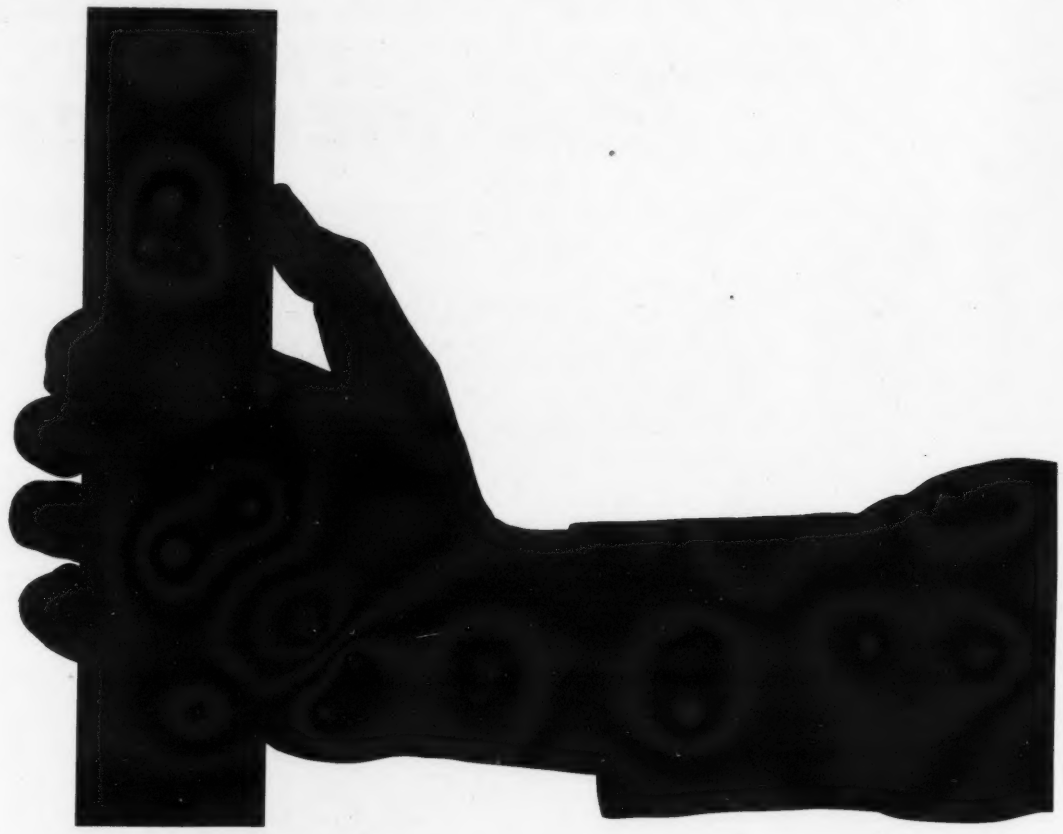

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Preventing Computer Abuse

DP Auditor's Biggest Obstacle: Lack of Sharp Staff

CW West Coast Bureau

SANTA MONICA, Calif. – The lack of adequately trained personnel is the biggest problem the EDP auditor faces in his effort to prevent computer abuse, according to a computer audit specialist with Touche Ross & Co.

Carl A. Pabst, who directed the computer audit project for Touche Ross at Equity Funding, spoke at a seminar here on computer abuse for auditors held by the Los Angeles Chapter of the EDP Auditors Association.

Pabst said auditors are now in a second phase.

The first phase, he said, was the recognition that a problem existed for EDP auditors.

The problem, he said, now is in developing staff and redeveloping procedures.

"In general, the people exist but there are not enough of them."

He cited a dearth of courses to train auditors in EDP in California and outlined the procedure used at Touche Ross to train auditors.

In assigning personnel to audit EDP operations, a ratio of three auditors to one EDP-oriented person has worked out best for Touche Ross, he said.

If there is one person available to do the audit, then he should be an auditor, but if two are available, then one should be an auditor and one an EDP person, Pabst said.

Only 10% of the EDP audit problem is technical, he said.

Forty percent is common sense, 30% thinking imaginatively and 20% is knowing the jargon, according to Pabst.

"The worst thing a company with an EDP installation can do," he said, "is to think it has controls and not have them."

While he did not refer to his work with Equity, Pabst mentioned another company that assumed it had control over access to terminals when, in fact, operational procedures at branch offices did not adhere to the controls, causing 25% of transactions to bomb.

Regarding the cost of EDP audits, Pabst said an initial review of an EDP installation should require a minimum of 40 hours, depending on the company.

Twenty percent of the budget for the EDP audit, he said, should be for final evaluation of results, documenting the audit and preparing the final report.

EDP control objectives, he said, should include the following:

- Complete and accurate processing of all data.
- Prevention and detection of misuse of equipment and data.
- Continuous operating capability.
- Development of effective, efficient maintainable systems.
- Prevention, detection and correction of errors.

War, Peace Data Bank Active

CHAPEL HILL, N.C. – A computer system here continues to forecast international happenings. Its most recent prediction, made in early March, indicated the Arab oil embargo would be lifted by April 1.

Professor Edward Azar, who developed the system now running at the University of North Carolina said his IBM 370/165 Conflict and Peace Data Bank (Copdab) [CW, March 20] was fed information from newspapers and the March meeting in Washington between the oil-consuming nations affected by the embargo. By running the data through his "international relations range" program, he found the political differences between the Arab nations and the oil-consuming nations rapidly falling from the critical range back to normal.

Although the system is presently being used experimentally by political scientists, the State Department continues to express interest in using Copdab in the near future, Azar said. However, he added that more work to perfect the system is needed.

Explaining more about Copdab's most recent prediction, Azar noted: "Because most of the nations tended toward the French attitude to go easy on the Arabs and not push them too far, we saw the Arab satisfaction growing day by day." As a result, he said the political scientists working with the system merely had to translate this satisfaction into the amount of days it might take the Arabs to lift the embargo.

He noted that presently 328,000 news items have been input into the computer.

Besides taking news from the public press to aid its clairvoyance, the Copdab memory digests items extracted from national policy statements around the world, diplomatic reports and information gleaned from Senate and House hearings on international matters, Azar related.

System Programmed For Real Garbage

GREEN BAY, Wis. – Earlier this month a University of Wisconsin computer was said to have a "garbage" program. The UW programmer in charge even admitted he programmed trash.

Actually, the university ran a workshop for local high school students in which household garbage generated by the average family was analyzed for its economic, and in turn, recycling value.

In addition, according to workshop coordinator Joanne Westphal, the students got first-hand knowledge in respect to the immense quantity of waste the average family produces. She pointed out that the packaging policies dictated by the consumer are the major reason for this amount of trash. And when the Xerox Sigma 6 analysis of the garbage data collected is complete, the students will know more about the problems of solid waste disposal.

Students participating in the workshop collected garbage from their family's trash can for several weeks and separated it into categories – newspaper, clear or colored glass, plastic, aluminum or steel cans, and good old organic garbage. Then the different types of waste were weighed and the data was entered on a questionnaire that was run through the "garbage" program at the university.

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Minis, Maxis To Dominate AEDS Conference

NEW YORK – "Mini to Maxi – Creativity in Education" is the theme for the 12th Annual Convention of the Association for Educational Data Systems.

The convention, May 7-10 at the New York Hilton, will include vendor exhibits and a series of sessions in the areas of personnel management science, administrative management services and instruction and research.

Societies/ User Groups

Wednesday's program includes sessions on virtual machines in instruction, computer-assisted instruction and management monitoring using the systems approach in education.

Long-range planning, computerized master schedule generation and in-house financial systems will be covered on Thursday, as will computer-based instruction, and computer decision-making in the classroom.

On Friday, a session will deal with cost justification, test scoring and systems analysis in education.

Registration fee for the conference is $50 for members, $60 for non-members.

Further information is available from AEDS, 1201 Sixteenth St. N.W., Washington, D.C. 20036.

NCR Users Plan Management Talk

CINCINNATI – A full-day management development program for DP managers will kick off the international meeting of the Federation of NCR Users, May 5-8, at the Netherlands Hilton here.

"A number of DP managers are selected for that position because of their technical experience rather than their administrative background," said Roger Wilgus, chairman of the federation. "This special session is designed to help these people develop their management capabilities."

The general users meeting will consist of 77 technical sessions covering such areas as electronic funds transfer and the use of computers in labor negotiations.

For further details contact Frederick Pohl, NCR, Dayton, Ohio.

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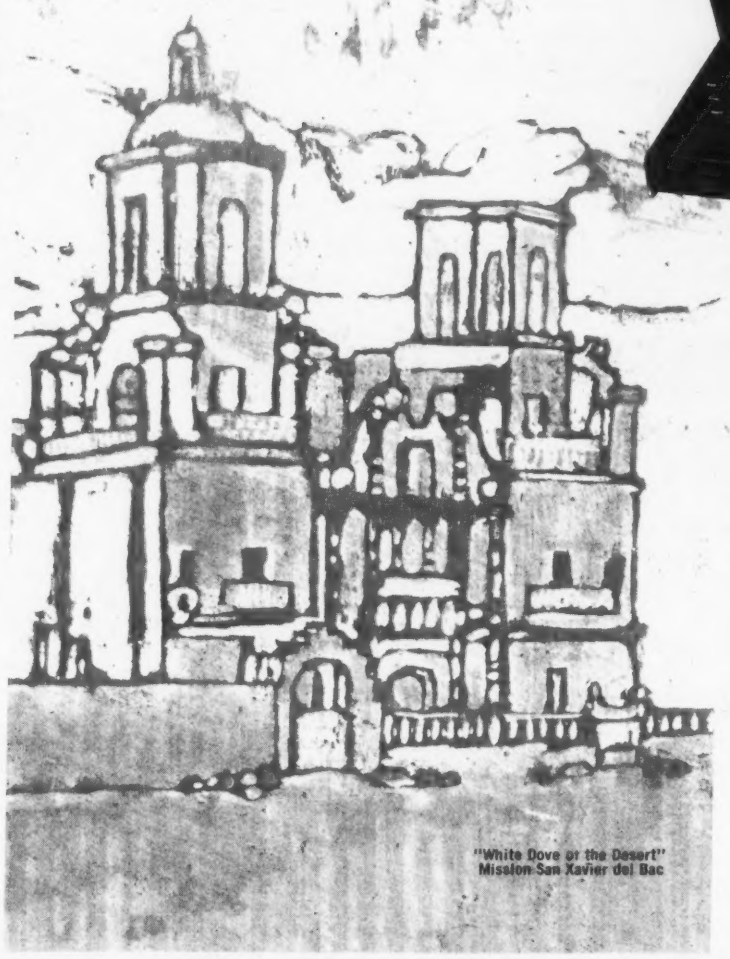

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Editorial

The Fire of Spring

The New England winter is breaking up. That special light-green frosting is on the trees. The gentle susurration of salt eating away underneath the fenders is stilled. The twittering of the *Computerworld* staff as it prepares to migrate to Chicago enlivens the newsroom.

It has been a bad winter, an ugly winter. There was the hard freeze of Watergate, the blizzard of the oil company crisis, the dirty snow of the Hearst affair.

Now we look for freshness and openness, for a season of hope. Our amazing technology can help, can model a better world, can protect rather than infringe on human rights. In April, it still looks possible.

But remember the full quotation:

. . . . . in the fire of Spring
The Winter garment of Repentance fling:
The Bird of Time has but a little way
To fly — and Lo! the Bird is on the Wing

"I'll Bet Ten Bucks That Ervin Said 'Po' Country Boy' More Times Than Ehrlichman Said 'Not to My Recollection.'"

Letters to the Editor

Public Must Be Told Of DP School Inadequacies

Thank you very much for the front-page article on "DP School Inadequacy" in the April 17 issue. We need more such articles available to the general public, not just to computer people.

There are no doubt many good private schools that offer good DP courses in programming and operations, but the bad ones need to be pointed out because, unfortunately, they give the good ones bad names. The general public believes that DP jobs provide high salaries and job security. They want to get into this profession the quickest way and that is via trade or business schools.

Several years ago I moonlighted as an instructor in a DP course for a business school. There were two other instructors who also worked nights there. At the time, the course consisted of unit record equipment (this was over 15 years ago). I taught the IBM 407 and 604. By the time a class got to me, they should have known all about selectors, counters and the like. Such was not the case.

When I inquired as to why they didn't know such things from their study of the 077, 514 and 402, I was told they hadn't studied that about those machines. As any old unit record man will tell you, selectors are what really make those machines perform their stuff. Further inquiry showed that the other two instructors horsed around with the prettier lady students, told jokes and took the class on field trips to a certain installation to see the machines running live jobs.

This information so intrigued me that I inquired as to what they were told when signing up for the course and how much each one paid. They were told that upon finishing the six-month school they would be qualified to step right into an "experienced" operator's job, be a programmer, a supervisor or department manager. The students paid anywhere from $300 to $500 for the same course, or whatever the salesman figured he could tap them for. Job placement was also high on the promise list. Frankly, I wouldn't have touched any of them with a 10-foot pole to be in my outfit.

Lesson plans or manuals for the course were nonexistent. I wrote my own lesson plans for the 407 and 604, but there were none at all for the other machines taught by the other instructors, and they didn't care.

As soon as I found out all these things, I left in a blinding flash, never to return. Before leaving, though, I told the students just what I thought of the school and its course and suggested that they try to get their money back even if they had to file suit. Some time later, I saw in the paper that two of the people connected with the school, including the hot-shot salesman, had been convicted of some crime and sentenced to jail.

Tom Crenshaw
Head of Data Processing
Visador
Jasper, Texas

The Hard Task Ahead For DP Schools Is Twofold

We applaud the article on the *Boston Globe* investigation regarding ECPI. Data processing schools must live up to the standards of the profession if they are to provide a valuable service to the student and the DP community.

The task, as I see it, is twofold:

- To improve the quality of education, admissions, and placement policy of the data processing schools.
- To assist the prospective student of DP in making a more informed decision before enrolling in a computer training school.

If these two items can be accomplished, the good schools will get better and the bad schools will perish.

Robert D. Asbury
Director of Education
Computer Processing Institute
East Hartford, Conn.

GRI and Focus IV

I was sorry to hear of Ken Opp's unfortunate experience with a Focus IV [CW, April 10]. We installed a Focus IV (now GRI small business system) in late September 1973 to replace our commercial time-sharing system on a Univac 1108 with a Friden 5015 terminal, used to prepare checks and invoices while punching a paper tape.

Even though we had never worked in RPG II, we were able to convert our payables and a multilevel general ledger system in two weeks and our receivables, payroll and financial system were fully converted by March 1, 1974.

Focus IV's bankruptcy did not affect us because GRI picked up our account and has given us excellent software and hardware support when needed. The system has only been down one hour in six months, even though it runs in an environment from 67 to 85 degrees F.

We installed dual terminals and printers to allow direct data entry while we were running our normal processing. By letting the mini edit and prompt the clerk, we have reduced our data-entry time to less than half that of the off-line Friden 5015 and our errors by 80%.

IBM quoted us a System/3 and off-line 7880 to do the same work for $139,230; we paid less than half that for the multiprocessing GRI system. I agree with Opp that the new minis have given businessmen a viable alternative to both the larger computer and IBM.

Roy Rose
Manager Data Processing
Interstate Oil Transport Co.
Philadelphia, Pa.

And A.M. Turing!

Herbert Grosch mentioned several individuals who can be credited with significant ideas in the development of computers, in a reply to a letter from Jerry Cohen [CW, April 10]. Through what is probably a simple oversight, he did not mention A.M. Turing, who (in 1937) specified a mathematical concept (the Turing Machine) which characterizes any general-purpose computer in use today. We owe the main concepts in the translation of computer languages and computer science to Turing; more importantly, his work showed that the concept of "computer" is independent of the technology used to implement it. No one individual, as Grosch so rightly points out, can be called the "inventor" of the computer in the simple-minded way in which we call Edison the inventor of the lightbulb. But Turing deserves a place on Grosch's honor roll.

Edward G. Nilges
Chicago, Ill.

Call It a Misdeal

Readers of the article "Two in the Hand" on Page 8 of the April 17 issue could suffer severe financial losses if they rely on the "computer analysis" under circumstances similar to those described.

The odds reported of 753,334,487 to one most likely represent the odds against two royal flushes appearing during *any* one hand of two-handed seven-card stud poker, rather than under the specific circumstances described in the first paragraph.

Where one hand is already known to contain a royal flush and the second hand is known to contain four-fifths of a royal flush, the odds against the last card completing the second royal flush are only 40 to one, since there is one card which will complete the royal flush out of the 41 cards you have not yet seen.

The author of "Two in the Hand" should be "Red in the Face."

Albert E. Reavill Jr.
Hartford, Conn.

He is. Ed.

Let's Play Poker

I think that I am ready to play poker with you, after reading your story on the odds of two royal flushes in one hand.

First of all, in seven-card stud you only see *four* cards, so that you wouldn't know if your opponent had a royal flush.

Secondly, if you were drawing a specific card to fill out your own (second) royal flush, the odds would clearly be one in the total number of non-visible cards. You can see your own six, and four in each of your opponents — the highest odds at that point of drawing the card you want are one in 42.

Dick H. Brandon
New York, N.Y.

Computer Didn't Play

Thanks for referencing my numbers for the odds on drawing double royal flushes at seven-card stud poker. However, while I have occasionally used big number crunchers to simulate blackjack and to analyze various gambling systems, I did *not* employ a computer for this poker calculation — except for using my $50 Sears home electronic calculator, to check my hand calculations of a cumbersome string of figures!

Also, note that the chance of *any two* players both getting royal flush is significantly higher than for *two specific* players. For example, with a typical six players, there is a multiplier of 6 X 5 / 2 = 15, and the chance is approximately 15/750,000,000 or 1 in 50,000,000.

Finally, a large computer *could* be most helpful in determining the general single player probabilities at seven-card stud poker (royal flush is straightforward . . . but two pair and one-pair are tough). To my knowledge, correct values for the complete set have never been published. There are 52!/(45! 7!) = 133,784,560 combinations, and the reasoning gets fairly subtle because all overlapping higher rank combinations must be excluded in calculating lower-rank combinations.

Dr. Allan N. Wilson
La Jolla, Calif.

DP Function Doesn't Exist in Vacuum

Lack of Long-Range Planning Obvious in Most Firms

By Louis Fried
Special to Computerworld

Whether it's called management information systems, the data processing department, the computer division or "the IBM room," the EDP activities of most organizations suffer from one common failing: the lack of long-range planning.

Those principles of strategic planning that have been adopted by a majority of the major corporations and which depend heavily on the computer sciences have, for the most part, not been adopted by the computer managers themselves.

The excuses for planning in a short-range, adaptive mode, are numerous. They include the fast pace of changes in hardware and software technology, the high rate of personnel turnover in the field, the constant changes in system requirements, and the frequency of unexpected user demands.

All these reasons indicate a clear recognition of the changing environment of which data processing is a part. However, many DP managers fail to realize that they themselves are the agents of change and should be in the best position to plan how those changes will take place.

A long-range plan for DP consists of the following elements: the systems plan, the hardware plan, the software plan, the staffing plan and the control plan.

First, the DP function does not exist in an organizational vacuum. As a part of the organizational environment its planning must be consistent with the plans of all other elements of the organization. For example, spending must coincide with the expected earnings of the organization. In addition, no plan for a part of the organization can be designed independently of the overall organization plan. No successful long-range plan for EDP can be developed unless there is a specific corporate long-range plan with stated goals and objectives for the corporation and for the user divisions.

The following elements of a corporate long-range plan are necessary to provide the environment for successful EDP planning:

- A statement of corporate socioeconomic purpose.
- A corporate strategic plan stating major long-range goals and objectives, major policies, major constraints and anticipated environmental conditions.
- A corporate tactical plan stating short-range objectives, and schedules to component parts of the organization.
- A divisional long-range plan setting forth the detailed methods for meeting the objectives and schedules, and descriptions of specific constraints and environmental conditions.

Viewpoint

The second requirement for the EDP long-range plan is to recognize that developing a plan takes both time and effort.

The third requirement is that a system must be established for charging out the cost of the DP functions to the users on a basis consistent with their percentage of use. Without such a system no control mechanism can be developed, no true economic feasibility can be determined for system proposals, and no short- or long-term EDP budget can be properly justified.

The fourth prerequisite is a plan for planning.

Developing the systems plan is probably the most time-consuming and critical portion of the long-range planning effort.

The DP manager and his planners must familiarize themselves with the corporate and divisional plans, the organizational structure, the business methods of the firm and its product lines.

They must develop a clear picture of how the various functions of the organization interrelate and how the systems currently operated by the DP department assist in these functions. One way to establish this picture is by flowcharting the business. This type of chart can be further enhanced by identifying the organizational responsibility for each function and by clearly identifying which functions are and are not computer-supported.

Each present DP system should be reviewed with its users to determine areas of potential change or enhancement. If, as frequently is the case, the users are not familiar enough with computer capabilities to assist in this planning, the planning staff may have to define potential changes and enhancements based on their knowledge of the function being supported and computer capabilities. These definitions should then be reviewed with the user groups.

When this section is completed, the planning group must turn its attention to those areas that are not presently computer-supported. System forecasting for these functions should take place in the following steps:

- Review potential changes of these functions with the responsible units.
- Examine the function for technical potential for automation.
- Rough out a systems concept (perhaps a brief flowchart and five or less pages of narrative).
- Review the systems concept with the potential user.
- Prepare a final technical system concept paper.

After documenting the potential changes to existing systems and potential new systems, develop "ball park" estimates for the cost of development and implementation and the continuing cost of operation for each of these.

Considering the present cost of operating the function, the present and future capacities of the systems, the present and future flexibility and the economic effects of present labor-intensive methods, prepare a chart for each application showing the projected cost of the present methods versus the proposed methods on a five-year basis. Using the same material prepare a pay-back analysis for each proposed application.

The result of this effort is a list and a description of economically feasible potential applications, or solutions to problems that cannot be solved without the use of a computer, for review with management.

The selected applications must now be examined for priority of development in terms of cash availability, return on investment and consistency with corporate long-range plans.

Louis Fried is vice-president for management services at Pioneer National Title Insurance Co.

'Now Hold On, It's My Turn to Bring Up My Problems First'

New-Style Computer Selection Cuts Work, Helps Results

For years computer vendors have effectively told users how to procure computers – both directly and by subsidizing universities and schools which then taught standard selection methods. Basically the procurement process included four steps:

- Issue specifications to at least the big six vendors.
- Receive proposals from many vendors.
- Choose the best price/performance machine.
- Sign on the dotted line, using standard terms and conditions.

Reading Callaghans' Computer Law Reports I find that the General Accounting Office does not think this is the only way to handle a procurement. It has even supported government computer users who excluded some of the big six from procurements unless they were prepared to change their policies.

IBM didn't like that and asked the GAO to stop the users from acting in such an "unreasonable" manner, but was rejected. So it is worthwhile looking at the computer selection afresh to see what improvements can help the user get what he needs and wants.

The Taylor Report
By Alan Taylor, CDP

A different selection procedure is illustrated in the box. Under this technique the user specifies at the outset what he needs, and the user's technical teams are only called upon to evaluate between sets of equipment which are offered on terms compatible with the user's needs. This eliminates a great deal of work, as most of our computer vendors currently only offer bare hardware, although their salesmen make it sound as though they are offering guaranteed reliable systems.

By checking the contract situation first, before looking at brochures or becoming experts in software manuals, a lot of work can be saved. This work too often results in the technicians' preference for various gimmicks becoming a more important decision-making factor than his employer's needs for more than hardware and "help."

An interesting point about the new method is that it provides for evaluations to be handled in terms of user priorities, rather than in terms of some absolute level of science. This means that, for instance, the importance of different undetected error rates is evaluated in terms of the particular application, rather than in laboratory terms of 1×10^{-13} Management therefore is involved in the real decision-making.

I must say that I like the whole idea. From a logical point of view, and with the current set of dangerous contracts that are being foisted upon so many users, almost any change would be an improvement. The amount of unnecessary technical work currently being performed, and the effective exclusion of management from so many decisions risks both overblown DP departments, and sky-high DP hardware budgets. By contrast, a method of buying functional usage is good. I just cannot see any defense for the continuation of the traditional method.

The only defense can be "don't rock the boat," and I won't accept that as a complete answer to anything.

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Rights of Users Defended

The case in which the rights of the user to exclude even major manufacturers, when they were prepared to conform to user-defined contract terms, started in 1971, when after several attempts to have a model contract changed to IBM's way of thinking (i.e., user taking most of the real responsibilities and risks), IBM wrote to a U.S. Government contracting officer as follows:

"... the Limitation of Liability clause we proposed, and which represents the only contract term upon which agreement has not been reached, must be included in the model contract."

This arrogant approach was followed by an attempt to get the contract kicked out by the government watchdog, the General Accounting Office, have any contract awards stopped and generally to get in the way of operations.

In its appeal IBM argued that the policy of rejecting proposals containing exclusionary clauses was improper and restrictive (because IBM would not itself propose anything!).

The U.S. controller general countered by pointing out, "We are aware of no statutory or regulatory provision which requires (the user) to disclaim implied warranties and exclude consequential damages ..."

This in fact was what IBM was arrogantly demanding in this case – and which it equally arrogantly demands of many commercial users.

(Case details from Page 781, Volume 3 of the *Computer Law Service*, Editor Robert P. Bigelow, Publisher Callaghan & Co., 6141 North Cicero Ave., Chicago, 60646).

New Style for DP Procurements

- **Investigate legal conditions under which computers can be obtained.**
- **Select best available legal conditions giving acceptable range of computers.**
- **Write functional specification based on best available contractual situation, and invite proposals.**
- **Ignore nonconforming proposals, select and award contract.**
- **Keep developments within contractual provisions, on both sides.**

The five-step computer-procurement method requires much less technical work, because many computer vendors will not be able to satisfy user management demands that the vendor take substantial responsibility for the accuracy of his proposals, reliability of his software, etc.

Compared with the traditional method, where all proposals are investigated without regard to management opinion on the legal issues, this method could produce more acceptable contracting at a lower cost.

Letters to the Editor

Some Not-So-Nice Words on CDP Examination

I'd like to take this opportunity to speak on the CDP examination and the administration of it.

First of all, the physical conditions for taking the exam were poor. Every part did not start on time, with 45 minutes being the longest waiting period. The writing surface was inadequate for holding the test and answer sheet; needless paper fumbling followed. Those responsible for administering the exam treated us like 10-year-olds, who might steal the crown jewels.

Secondly, the exam(s) was poor in format and readability. Typographical errors occurred in questions and answers. One answer (which was the correct answer, I believe) had the man's name misspelled. As usual, one of the answers for that question was "none of the above." Was this a trick question? Or was the misspelled name the correct answer? Anyone involved in testing and evaluation openly states that questions of the following types are poor questions.

1. Which of the following . . . is false?
2. Which of the following . . . is true?

Also, questions with responses as those listed below are considered poor.

1. None of the above
2. All of the above
3. A and B, but not C

Incidentally, third, I hope it wasn't mandatory to have my signature on the reverse side of the answer sheet, since no one informed me of it.

Incidentally, fourth, the CDP Review Manual had errors in it. These errors were trivial to the expert, but difficult for the novice. Note the glaring error on the only graph describing breakeven analysis.

Finally, the grading and reporting are abhorrent. What does one standard deviation above/below the mean really mean? (outside of the statistical relevance to the tester, which is probably why statistics as a subject was developed.) Is it impossible to tell the testees how many were missed in each part? Telling me how many I missed is really very relevant to me. More can be done in providing feedback indicating weak areas, particularly on the multi-topic exams (i.e., quantitative methods).

Can it really take 12 weeks (for a leading DP organization) to compile the statistics provided to the prospective CDP holder? It's fortunate that the grading of the exam is done by electronic means, otherwise we probably wouldn't get the results in our lifetimes. I would be willing to make a large wager that with 2,500 people taking the exam, I could:

1. Hand-grade all exams,
2. Hand-compute all the statistical nonsense,
3. Provide better feedback,
4. Hand-address all letters,
5. Personally lick every stamp,

and still have the results in the aspirants' hands *within* 12 weeks.

There is some talk (perhaps just hearsay) that questions are ignored because too few people got them right or wrong. Is this helping the ones who don't know the material or hindering those who do?

On the more complimentary side, I feel the content of the questions on the exams has been good for the last two years.

I respectfully request that my name be withheld. I'm still an aspirant for whatever merit the certificate might have.

Name and address
withheld by request

Praise the Small User

"Hats off" to Evelyn Forest Thomas [CW, April 3]! It's not often a small user voices an opinion and is heard.

The NCR Century series of computers' upward compatibility is for real. Thomas's letter was justifiable and factual in all respects.

Having been an NCR Century user for three years and having upgraded from a Century 100, 655 disk system to a Century 200, 657 disk system with multiprogramming does qualify my answering the question of easy upgrading on NCR equipment. All Century hardware is upward-compatible from the Century 50 to the Century 300.

I have on occasions compiled and run Century 50 programs on the Century 100 and Century 200, Century 100 programs on the Century 200 and Century 200 programs on the Century 251. We have even been able to downgrade and utilize a local Century computer on occasions.

No reprogramming or recompilations are required to upgrade. Staying in the basic Neat/3, Cobol or Fortran coding language will also let you upgrade when necessary. The Century series is designed with upgrade in mind and truly has accomplished this most effectively.

Richard R. Blouin
Vice-President & DP Manager
First Guaranty Data Center
Hammond, La.

'Walking on Water'

Before I get inundated with calls from all over the nation concerning our apparent ability to "walk on water" expressed in your article on "Bank Finds Way to Cut Turnover" [CW, March 20], I think we need to correct two slight misquotations, viz:

In the paragraph, "Another move which reduced turnover . . . Metcalf said. 'A programmer doesn't particularly want or like to document, and if he's documenting, he isn't programming, and you're not maximally using your resources.'"

That was the rationale we used when we added tech writers to our staff to handle systems and programming documentation. The tech writers are responsible for documenting and maintaining the systems manuals, the operations manuals and the user's manuals.

Further, regarding turnover rates, the systems development & programming department's professional controllable turnover rates are:

Year	#P/S	#Terminations	%
68	27	9	33%
69	27	9	33%
70	21	0	0
71	22	0	0
72	24	1	4%
73	27	2	7%

C.W. Metcalf
Vice-President
Bank of the Southwest
Houston, Texas

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Give the Controller His Next Bright Idea:

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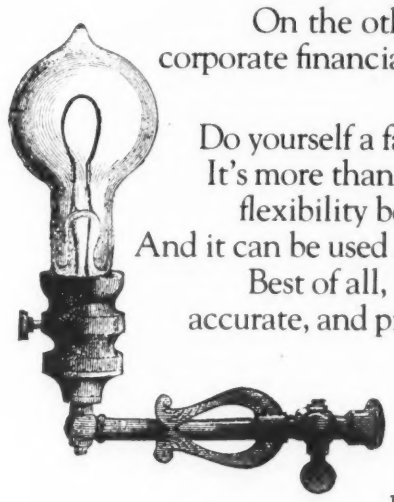

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Typical User Processing Cycle

Data Gathering	Closing Cycle: Detail Trial Bal, P & L, Balance Sheet	Other Reporting: Budget Reporting, Comparative Reports, Departmental Reports	Analysis

Software International System

Data Gathering	Closing Cycle	Other Report	Analysis

Building an Entry System Under DOS/VS—Part I

CICS-Dbomp Combination Makes Toy-Maker Orders Fly

By Don Leavitt
Of the CW Staff

SPRINGFIELD, Mass. – Early last year, Milton Bradley Co. (MB), a major manufacturer of games, began to develop a new order entry system – one that would accept incoming orders, process them, post them to an immediately accessible data base, and prepare shipping documents in as little as 30 minutes from the time the orders were received.

To reach that goal, MB worked with Keane Associates, a custom programming house in Wellesley, Mass., to interface two IBM systems: the Data Base Organization and Maintenance Processor (Dbomp) – to manage file handling – and Customer Information Control System (CICS), to manage on-line communications. And MB put the resulting system all together under DOS/VS.

Last Christmas season – a crucial period for a toy maker – MB put its new system to the test. It didn't meet the design goal of a half-hour cycle, but did cut the old processing time in half, while handling 40% more orders than ever before.

To get to its current level, which is closer to the half-hour goal, has taken 11 months' work by MB's 38-person DP staff and people from Keane, and $200,000.

It also required two basic corporate decisions. MB has set up a completely on-line environment in which punched cards and paper flow are eliminated. And it turned the entire data entry function – including file maintenance, update and access – over to the end-user departments.

The DP people had to build a set of dynamic files that could be accessed by unskilled personnel working with IBM 3270 CRTs. They had to set up security keys and file commands that would maximize file integrity and minimize error conditions.

The company also had to reassign data entry operators to user departments. Within the DP department, it had to shift everything from a batch-oriented Honeywell 425 to an on-line, VS-based IBM 370/145.

To allow access and display of any order, and its total file contents, within two seconds of its entry, MB developed a faster access technique, and also "streamlined" the system design to have only 13 files instead of 23, as originally planned.

Creation of a direct-access (DAM) file is one of the keys to the immediate response requirement of the system. Though they include capabilities MB wanted, CICS and Dbomp operating under DOS/370 normally don't have the speed the company saw as mandatory.

Keane Associates reviewed the logic of the CICS system and found that replacing a Dbomp file with standard direct-access coding under CICS would achieve the response level desired. The technique used effectively simulates a partitioned data set, a storage approach usually available under OS but not DOS environments.

The partitioned data set, in this implementation, is the current order file and includes enough disk space to hold the skeleton orders as keyed in by the operators and the supporting customer and product information from other files in the system, which was added to the skeleton by the application logic.

In addition, the DAM files concept eliminates chaining item records, a step that typically requires significant computer time. Operators can go directly to data stored in the DAM file. This feature cuts search time as well, for very little software and logic, and very few fetches, are needed to access the order record.

The file and the access scheme used with it also permit flexible operator utilization. As each operator signs on, her code opens a certain sector in the data set for her use. Any terminal can be assigned to any task, and operators can use whatever unit is nearest to where they are checking a particular aspect of an incoming order.

Random Notes

Fortran H Run Performance Now Monitored by 'Strobe'

CAMBRIDGE, Mass. – Programart Corp. has added Fortran H support to the capabilities of its Strobe system, a measurement package that shows how application programs consume time on IBM 360/370 equipment. With this new capability, CPU usage by a Fortran program can be identified by logical source statement numbers assigned by the programmer, as well as by storage address.

In addition to CPU utilization, Strobe shows I/O resources used by each file, overlap of CPU and I/O demands, most heavily used coding and direct-access cylinder utilization.

Strobe is also available for Cobol, PL/I and Assembler language programs, Programart noted from 133 Mt. Auburn St., 02138.

'Ramis 5.4' Supports File Built From Separate Bases

PRINCETON, N.J. – Users of the Rapid Access Management Information System (Ramis) can now divide a file among several physically separate data bases, through a capability built into Release 5.4, now available from the Ramis vendor, Mathematica, Inc.

This feature permits users of different parts of a file to have complete read/write control over their own parts, but reports can be developed from many parts when the needs arise, Mathematica said, from Princeton Station Office Park, P.O. Box 2392, 08540.

Cross Assembler Does GA Work On 370/145 in Virtual Mode

SAN DIEGO – Users of the General Automation SPC-16 mini can generate and maintain programs on an IBM 370/145 under OS/VS1, even if they have little knowledge of the IBM environment, with the Host16 cross-assembler system from Decision Science, Inc.

Whole programs, in source or object code, can be stored on the IBM disks with the DSI software. Source programs can be edited, assembled and combined with previously assembled logic to produce relocatable or absolute core image output for the SPC-16. Host16 costs $5,000 from 4508 Mission Bay Drive, 92109.

'Trace' Reports Full Details Of Instructions Run Under OS

BROOKLYN, N.Y. – Programmers working in an OS or OS/VS environment can monitor the execution of any program, through a CALL from the program being developed or through a change in JCL, with the Trace generalized debugging package from DSK Systems, Inc.

Regardless of how it is invoked, Trace prints more than half a dozen pieces of information about each instruction as it is executed. The report shows the condition code, whether a branch was taken, and the instruction address.

The instruction mnemonic, the instruction in machine language and the contents of storage areas referenced by the instruction are reported.

Trace retains control even when operating system instructions are encountered and executed, but tracings are not provided. Trace may affect the execution of a program that is timing-dependent, the company noted.

Program Check

If a program check occurs during the tracing of a user program, Trace will print a formatted page of program check information, including PSWs and the user program registers. Then it will issue an Abend.

The DSK program supports various types of trace including a generalized facility that traces as long as it is active. Another choice results in printing only the result of instructions that directly change the program flow, such as both conditional and unconditional branches.

Trace output resulting from a BAL or BALR to a subroutine can be suppressed through another option, which effectively results in a tracing of mainline logic only. Special scans for PL/I or Fortran H internal statement numbers, and printing of only instructions with these numbers is also available under Trace.

Trace requires 8K of memory not including data management and I/O routines for a special Qsam output file, or the Abend requirements including optional Sysdump and Sysabend DD statements.

Trace will run on OS Release 18 and up; PCP, MFT or MVT options; and VS1 and VS2. It is available for $1,200, covering object deck and one-year maintenance. It can also be rented for $100/mo plus maintenance, from DSK at P.O. Box 38, Vanderveer Station, 11210.

'Handshake' Service Uses IDC File

NEWTON, Mass. – Users can "broadcast" requests for help or information to as many as 50 other sites with similar interests or equipment configurations, in any part of the country, through a single entry in the *Computerworld* Handshake service just introduced by CW's Research Department.

The service uses the installation data file compiled by International Data Corp., CW's parent corporation. Inquiries against the 27,000 sites on the file can be based on geographic area, equipment – mainframe or peripheral – programming language, operating system, industry or application, or any combination of these specifications, according to Wally Pitts, coordinator of the Handshake project.

Once it receives a request for a "Handshake," the research department searches the file extracting the names and addresses of up to 50 sites that meet the requester's definition. A message (up to 120 words long) from the requester explaining his need is then included in a two-way mailer sent to each site selected.

CW sends out the mailers, but does not provide the requester with a list of the sites contacted. Once the Handshake is made, it is up to the contacted user to get back to the requester, if he wishes to continue the interchange, Pitts noted.

The service costs $100 per request. If less than 10 installations on the file match the requester's needs, the service can be aborted, used with the limited contact list or expanded to reach other users.

The CW Research Department is at 355 Walnut St., 02160.

VALUE COMPUTING PUTS YOU IN CONTROL OF YOUR COMPUTER OPERATIONS

VS Scheduling is just one way.

Because it replaces confusion with confidence, speculation with specific answers for the IBM user who moved to VS, and now is not sure just what he might have gotten himself into.

Not that this new innovation in memory utilization is just a lot of VS, but sometimes the hoped-for benefits are replaced by job run-time stretchout, missed due-out times, system overhead degradation, thrashing. . .and second thoughts.

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Inverted System Has Good Growth Potential...

By Kent A. Ochel
Special to Computerworld

The article on data base management systems entitled "Erector Set or Black Box" [CW, March 13] was, I am sure, an accurate interpretation of Leo Cohen's presentation. I would like to comment on the "black box" analogy used with respect to System 2000, however.

System 2000 was designed to provide the user with an optimum mix of modularity, self-contained facilities and "customizable" features. A system such as IMS that requires the user to customize his entire data management software support is quite expensive to develop initially and then to maintain thereafter. This approach has an additional characteristic of forcing data management to stay solely in the hands of the programmer and to exclude self-help by the true end user.

A rapid return on investment for data management application development, cheap maintenance with high reliability and the ability to allow the end user to deal directly with his data are all excellent reasons for the design approach taken by MRI for System 2000.

The implication was made that the inverted file structure of System 2000 is not well-suited for growth into new application areas or additional data bases. This is definitely not the case. System 2000 provides a high degree of hardware, program and data independence which protects the user in the case of one kind of growth; modification or amplification of existing applications and/or data bases.

System 2000 also supports both direct access and sequential access data storage, update and retrieval, plus it allows the user to *dynamically* link two or more data bases (direct or sequential) together for retrieval of data. This feature imposes minimum index overhead and provides maximum flexibility for creating new data bases and associating the new data with existing data bases without any detrimental effect.

VIEWPOINT

I have read *Computerworld* for some time and have felt it serves the data processing community well. I do not believe it is serving its readers well, however, when it quotes statements such as the last paragraph in the referenced article. This statement is not supported by fact, but rather is based upon insufficient or misunderstood information and the subjective viewpoint of Cohen. If Cohen would like to specify those attributes of System 2000 that make it "at best rather clumsy and perhaps even difficult to justify," I would be more than happy to respond to them.

Kent Ochel is executive vice-president of MRI Systems Corp., the vendor of System 2000.

FSS Upgrades Loan Package

ORLANDO, Fla. – Banks with ANS Cobol compilers on any of a number of mainframes can perform simple interest computations or use traditional "78ths" or straight line methods, with a new Installment Loan System from Florida Software Services, Inc. (FSS).

The multibank/multibranch system includes flexible payment schedules, loan extensions, automatic billing and charge-off accounting. Extra dealer reserve and insurance amounts are maintained in both accrual and rebatable calculations to provide bank management with more detail in payment allocations, the vendor said.

A full range of loan types can be handled, FSS went on, with daily reporting, monthly summaries and management recaps optional by loan type, branch or bank.

The Uniform Consumer Credit Code option is included, along with HEW and dealer loan monitoring. The Credit Code is the provision in some states that late charges can be assessed only on the portion of a payment not received by a specified date.

The new package, an extensive updating of an earlier FSS system, is available in ANS Cobol for IBM 360s and 370s, NCR Century, Burroughs medium- or large-scale systems and Honeywell 6000 Series computers.

It can be purchased for $12,700 from FSS at P.O. Box 2269, 32802.

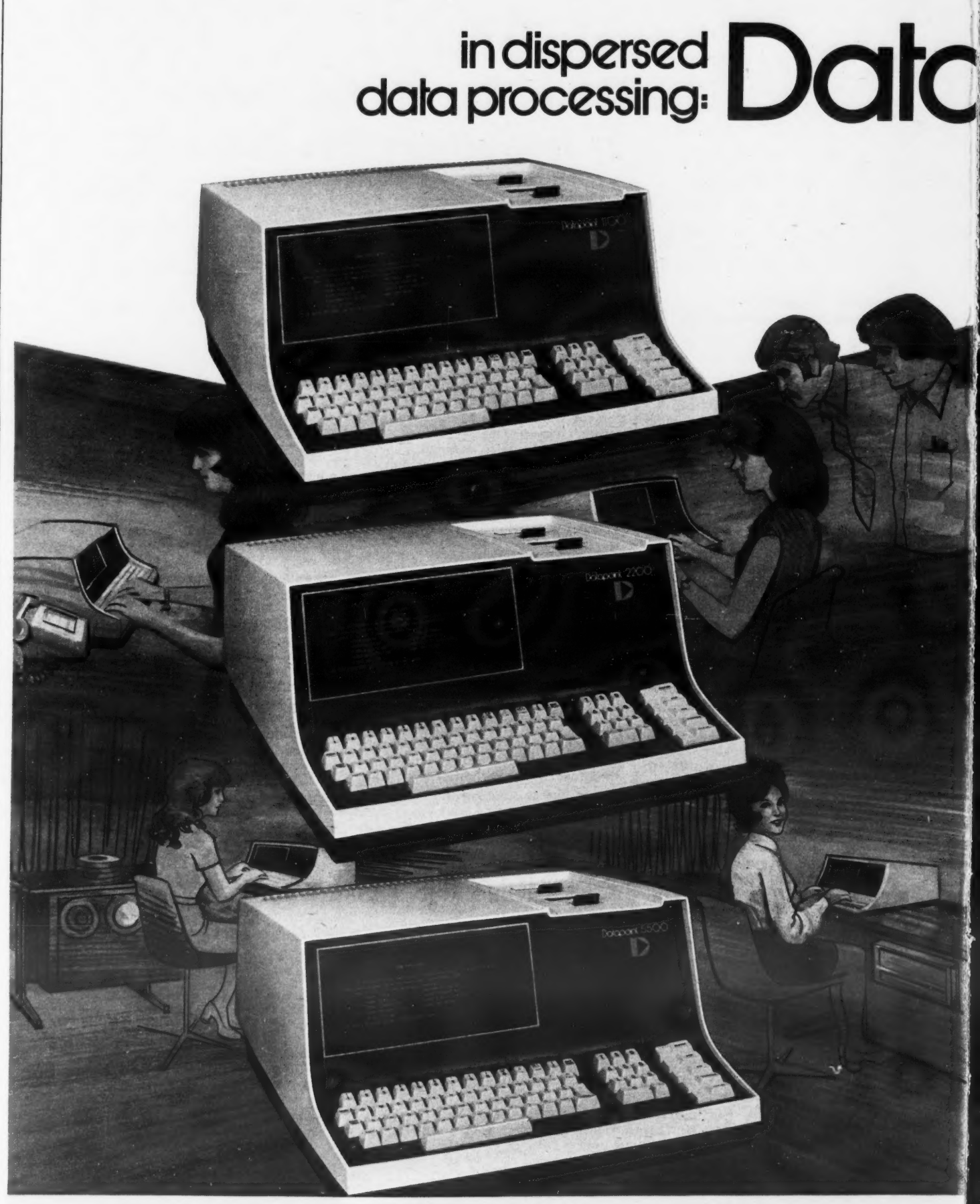
Utilities List, Load DL/I Bases

VERNON, Conn. – IBM 360/370 installations with IMS can eliminate special programs to load or print DL/I data bases, with a pair of utility programs now available from Data Base Management, Inc. (DBMI).

The Load module builds a data base from a sequential input data set and can transform the incoming data into another format, based on control card entries. After the data base is built, the module reports how many segments were loaded, and what segment names were used.

The List module can list an entire data base, specific roots or portions of the base, also under user control. For printing, the list module also can transform packed and binary data to display format.

The utilities run under OS or OS/VS and cost $2,000 each or $3,000 for the pair from DBMI, Vernon Professional Building, Vernon Circle, 06066.



...But Data Base Add-Ons Impact Performance

By Leo J. Cohen
Special to Computerworld

REBUTTAL

My remarks on the fully inverted data base management packages with regard to integration were made in the context of a comparison of the relative merits of such systems with respect to those offering more elaborate capabilities. Furthermore, the question is not integration alone, but rather integration in the context of performance.

By this I mean that the addition of new data base units to an already existing data base system should be accomplished so that the performance enjoyed by individual users prior to the integration is retained after the integration is complete.

This is not a circumstance that can be assumed to obtain with the fully inverted packages. With the others, however, enough flexibility and leadway is available in their pieces and parts that without disturbing current application programs, maintenance and general control of performance for all users can be achieved.

Ochel's remark concerning the degree of ongoing management of the data base environment required by systems such as IMS, Total and IDMS is entirely valid although I would place such responsibility in the hands of the data base administrator rather than the programmer, as his letter suggests. This, in fact, was a point made very strongly in my talk, and certainly represents the trade-off price to be paid for the degrees of performance that these systems make available to the data base administrators who must manage them.

So important is this point, indeed, that we have made many recommendations to our consulting clients in favor of the fully inverted packages, and in several cases in favor of System 2000. In such problem environments, however, the issue is generally not one of ability to integrate, or in fact even a serious concern with the Nth degree of performance.

Rather, the dominant issue is the end user and the degree of his inclusion in the design, development and ongoing operation of the data base system. That is to say, a particular corporate environment, quite aside from their technical data base problems, may more completely determine the nature of the package best suited to them on other less technical issues.

As I have said many times in many public places, there is no "best" data base management system, but rather one system that is best suited to a particular organization's needs. These needs may be described briefly as the data base technical problem; the talent available for resolving that data base problem; and the degree of ongoing technical support for the data base system that the organization is capable of supplying and is willing to commit.

Leo Cohen is president of Performance Development Corp., author of **Data Base Management Systems, a Critical and Comparative Analysis;** *and a lecturer on data base systems.*

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Fortran Sort Runs on Mini Or Full CPU

ANAHEIM, Calif. – Fortran IV programmers with direct-access DEFINE files can have general-purpose sorting capabilities with the Sort 70 Disk Sort package from Software 70. The utility is machine- and word-size independent, and runs on both minis and mainframes, the company said.

The routine sorts up to five fields of any length by word or byte, and the sort keys may be in or out of place. Sorting may be in ascending or descending sequence and the processing can be limited to part of a file.

If more than five sort keys are required, the sort program would be used repetitively until all the desired fields are sorted.

The utility requires only 2K to 3.8K bytes on an IBM 360. It can also be used on an IBM 1130 or System/3, DEC PDP-11, Data General Nova or General Automation 1830 or SPC-16.

Sort 70 can be purchased for $70.

Software 70 can be contacted through P.O. Box 3623, 92803.

Prices Up on NCSS Network

NORWALK, Conn. – Users of the National CSS network face a change in rate structure that will mean increased costs for most, but may result in decreased monthly billings for some.

Effective May 1, prices on machine time will go up, but large users may benefit from a change in policy in charging for mass storage. Usage will now be accumulated and users would gain the discounted rates previously available only to those who had constant high use of storage.

PRODUCT AND MARKET PLANNING

—

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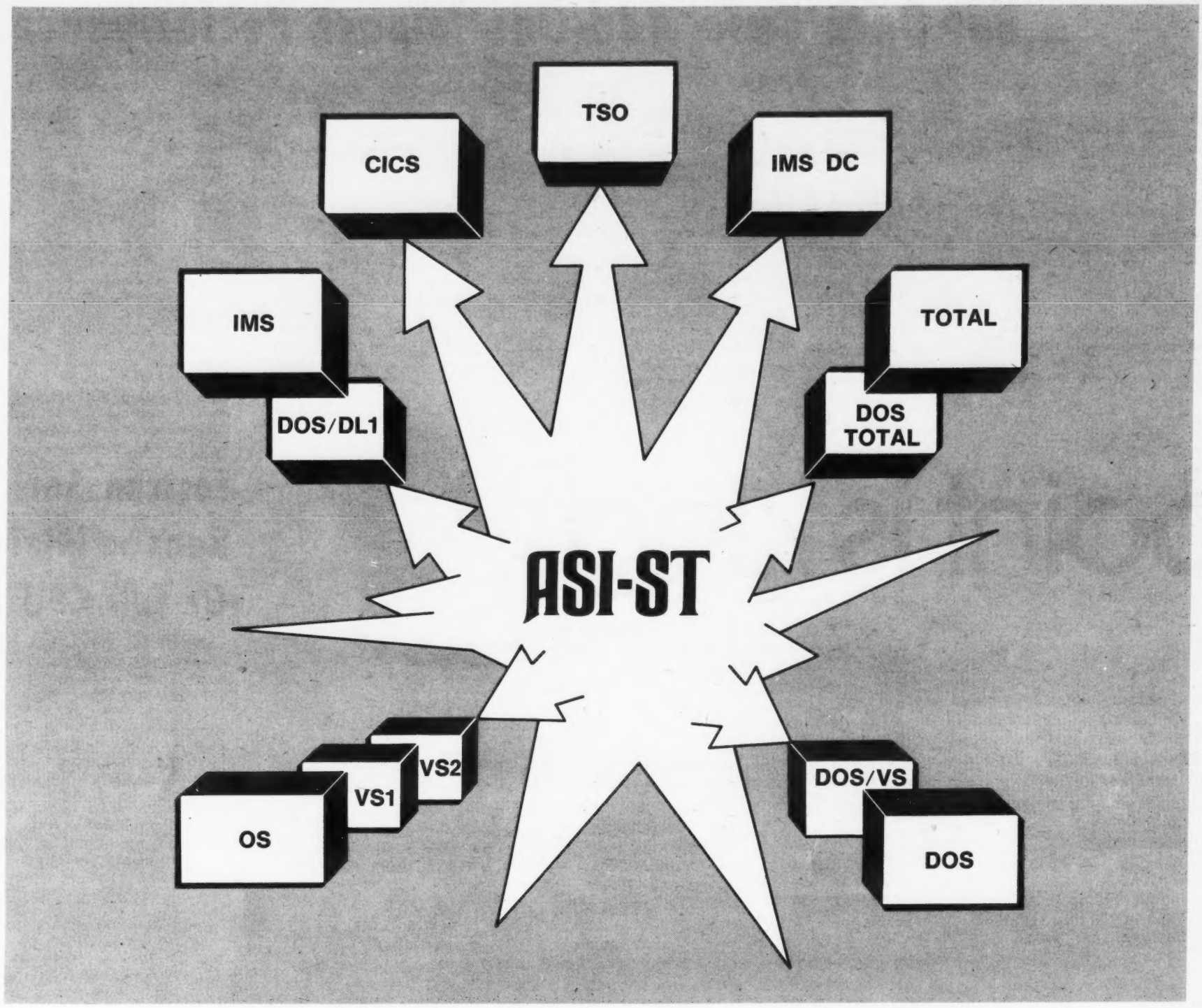

ASI-ST represents the *common denominator* to achieving productivity when processing conventional files and/or DL/1 & TOTAL data bases in Batch or On-line environments. ASI-ST is the most widely installed user language in IMS and TOTAL installations. Further, Conversational ASI-ST represents the only interactive conversational user language supported in all three (TSO, IMS DC and CICS) of the most frequently encountered T.P. environments.

As a result of the rapidly accelerating level of ASI-ST sales, ASI is opening new regional sales offices in major cities throughout the country. Accordingly, a number of openings have become available for qualified computer professionals. Should you possess the requisite skills and experience for any of the positions indicated below, ASI invites your inquiry:

- **REGIONAL SALES REPRESENTATIVES** — Must have a minimum of 8 years computer industry experience in both technical and sales capacities, including at least 2 years of successful hands-on experience selling proprietary software packages.
- **MARKETING SUPPORT REPRESENTATIVES** — Must have a minimum of 4 years experience in technical and sales support plus a sound working knowledge of COBOL and BAL.

In addition, ASI's growth has created openings at our Corporate office in Los Angeles, California for the following positions:

- **PRODUCT AND TECHNICAL SUPPORT REPRESENTATIVES** — Must have a minimum of 3 years computer industry experience with emphasis on applications programming using COBOL and BAL. Effective verbal and written communication skills desired.
- **SENIOR SOFTWARE DEVELOPMENT SPECIALISTS** — Must possess a minimum of 6 years software development experience using BAL primarily. Prefer candidates with a strong working knowledge of the internals of IMS DB, IMS DC and/or CICS.
- **SOFTWARE DEVELOPMENT SPECIALISTS** — Must possess a minimum of 2 years software development experience using BAL. College graduates with concentration in the Computer Sciences who were heavily involved in *creative* programming projects while attending school are solicited.
- **SALES MANAGEMENT** — Must have a proven track record directing sales of proprietary software. Will participate in the coordination of sales activities of ASI-ST, as well as new ASI software products.

NOTE: Exposure to software products such as ASI-ST, MARK IV and GIS preferred for all of the above positions.

Qualified candidates have the opportunity to join a highly successful technological leader in the development of general purpose software products. The working environment at ASI is continually challenging and stimulating. Such an atmosphere is conducive to maximizing career growth objectives and attendant remuneration in the form of:

- Competitive Salaries
- Profit Sharing
- Qualified Stock Option Plan
- Group Insurance

Should attendees at the N.C.C. be qualified and interested you are invited to contact either Don Sundeen or Jim Spickard, May 6-9 at the McCormick Inn (adjacent to N.C.C. Convention Center). Telephone (312) 791-1900.

Also, letters of interest and resumes specifying salary history may be submitted in confidence to:

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Data Briefs

Telenet Gains FCC Approval, Service Set for Early 1975

WASHINGTON, D.C. – Telenet Communications Corp. has received FCC approval to begin operation of its packet-switched communication network. The company becomes the second firm to get approval to operate a value-added network for data users. Packet Communications, Inc. was previously approved by the commission and a third company, Graphnet, will serve facsimile users.

Telenet is expected to be in operation early in 1975, a company spokesman said, and it plans to have an 18-city network operating by the end of that year. Telenet is a subsidiary of Bolt, Beranek & Newman, Inc. which developed much of the Arpanet technology for the system used by the Department of Defense. It is expected that the Telenet network will be patterned on the Arpa packet-switched system.

MI² Adds TTY Data Set

COLUMBUS, Ohio – MI² Data Systems, Inc. has a data set designed for installation in Model 32, 33 and 35 TTYs operating on the TWX network.

The unit can be mounted directly into a TWX terminal and includes a modem and a control panel. The panel includes a rotary dial and the necessary control buttons to originate a message.

The unit is compatible with Bell Data Access Arrangements and the Western Union TAA equivalent for the TWX network. It is designated the Design 101C/TWX data set and costs "under $600" from the firm at 1356 Norton Ave., 43212.

DCA Has PDP-8-Based Remote Concentrator

ATLANTA – Digital Communications Associates, Inc. has introduced the PRC8 programmable remote concentrator for the DEC PDP-8. This product compliments the Smart/680 and Smart/8e intelligent front ends for time-sharing systems already available from the firm, a spokesman said.

Key features of the PRC8 are: rate detection, message-oriented protocol with error detection/automatic retransmission and up to 80% line utilization.

The PRC8 supports up to 32 interactive mixed-speed terminals using only a 2,400 bit/sec full-duplex communications link to the Smart/8 front end at the host CPU. A limited number of 120 char./sec terminals can be handled through the PRC8 while using a 4,800 bit/sec communications link.

A typical system configuration is priced at $25,000 for 24 ports, excluding modems, from Suite 400, 2801 Clearview Place, 30340.

AT&T Unveils LSI 202 Data Sets, Modifies 209

By Ronald A. Frank
Of the CW Staff

BOSTON – AT&T recently began demonstrating LSI versions of its 202 data set series at the Computer Caravan here. The new units are designated 202S which is a replacement for the 202C, and the 202T which is a replacement for the 202R and 202D.

Both versions of the 202 are probably the smallest data sets available from the Bell System, measuring about two in. high by five in. wide by 10 in. long. They are expected to be available from local Bell operating companies about July 1, according to an AT&T spokesman.

The 202S operates at 1,200 bit/sec on dial-up lines or switched private line nets. Rates for the unit are covered under intrastate tariffs and average about $40/mo with a $50 installation charge.

The 202T operates at 1,800 bit/sec and is available with a 5 bit/sec reverse channel for $35.25/mo. Without the reverse channel, the unit costs $30/mo. A manual version of the 202T now costs $17/mo, but a new tariff rate has been filed and the cost for this unit will jump to $23/mo on May 21 if the FCC approves the filing. The 202T is covered under interstate tariff 260.

Both data sets feature diagnostic indicators including remote test, local test and analog loop back.

AT&T has also released additional details about its 209 data set which operates at 9,600 bit/sec on private lines. The new high-performance data conditioning designated as D1 will now be charged as a separate item.

Originally, AT&T had announced that D1 conditioning would be included as part of the 209's Dataphone 9600 service, but the separate charge will allow users with non-Bell modems to order the conditioning without the data set. The separately priced conditioning apparently was introduced by AT&T after the Independent Data Communications Manufacturers Association (IDCMA) filed a petition with the FCC to suspend the original bundled price.

The D1 conditioning could be a bargain for high-speed data users utilizing 3002 lines. The usual C-2 conditioning costs $19/per channel end or $38/channel, but the D1 conditioning is priced at $13.50/channel or $6.75/channel end.

In addition, the D1 conditioning specifications are believed to be an improvement over C-2 requirements. One drawback, however, is that the D1 installation costs users $150 while there is no charge for C-2 installation.

The 209 includes a rotary switch on the front of the data set to provide variable input speeds of one 9,600, one 7,200 and one 2,400, or combinations of 4,800 and 2,400 bit/sec channels.

There are no additional charges when the variable speed input features are used with units located within 50 feet of the data set. In such cases only the basic $230/mo with $200 installation charge applies.

But in configurations beyond 50 feet, an additional rate is charged which includes either a 201 or 208 data set depending on the speed. For each extension to a terminal there is a charge based on whether the terminal is located on the same premises or at another premises. But extension services apply only to terminals located within the same exchange area as the 209.

On the same premises, the rates are $115/mo with $150 installation at 2,400 bit/sec and $255/mo with $250 installation at 4,800 bit/sec.

For off-premises locations, the rate is $135/mo and $150 installation at 2,400 bit/sec and $275/mo with $250 installation at 4,800 bit/sec.

For extension services outside of the exchange area, "normal data set and facility charges will apply," AT&T said. For the extension services users apparently are required to use both AT&T lines and data sets since the lines are not priced separately.

Disconnection Doubted in AT&T/MCI Fight

WASHINGTON, D.C. – The battle between AT&T and MCI for control of certain central office facilities being used by private line users continues. At stake are foreign exchange (FX) and common control switching arrangements (CCSA) and these have been the subject of several court proceedings.

The U.S. Third Circuit Court of Appeals has vacated an earlier court injunction that required the Bell System to make these types of interconnections for MCI customers. Bell then issued a statement that it was "arranging for the disconnection from its network" of these facilities being used by MCI customers.

Rather than ruling in favor of AT&T, the Court of Appeals said the FCC had jurisdiction in the matter and said the lower court "should have awaited resolution of the interconnection issues by the FCC.

Meanwhile affected users apparently are in little danger of having their facilities disconnected. About 10 to 20 customers are estimated to be affected but an FCC staff spokesman said it would have to be notified before service to a user could be terminated.

An AT&T spokesman said Bell did not want to cause problems for customers. The spokesman said MCI would be asked to have its customers contact local phone companies for alternate arrangements from Bell and if MCI did not cooperate then the phone company would contact the users directly.

In the meantime, AT&T has postponed two proposed services of importance to data and other users. The high/low density rates which would have reduced rates for urban users and raised rates in rural areas has been postponed for 60 days. The rates, which would have restructured the monthly bills of private line users would have gone into effect on April 14. The FCC had requested a 90-day postponement but AT&T agreed to the two-month delay.

In a related action, comments on AT&T's proposed Dataphone Digital Service (DDS) [CW, March 27] were extended for two months until June 12. Data Transmission Co. (Datran) and other carriers that would have been affected by the proposed service had requested a four-month delay in order to more carefully evaluate the AT&T plan.

Portable Unit Prints Full Line

BURLINGTON, Mass. – Computer Devices, Inc. has introduced new versions of its portable thermal teleprinters that include 132 wide-carriage print positions to handle conventional computer printouts. The wide-carriage capability is said to make possible the recreation of full print lines at remote sites.

Called the Teleterm 1132, the 132-column unit includes built-in modem, coupler and TTY-type keyboard. It can handle data at 10-, 15- and 30 char./sec in Ascii code.

The unit is available at $3,900 or $165/mo on a one-year lease. An APL/Ascii version costs $500 additional and an APL/TTY model costs $25/mo more, a spokesman said.

The firm has also introduced the 1030 ASR Teleterm which includes dual micro magnetic cartridges. The cartridges can each store an average of 15K characters.

The cartridges are said to give the 1030 limited remote batch capabilities. The unit is also priced at $3,900 or $165/mo on a one-year lease. The company is at 9 Ray Ave., 01803.

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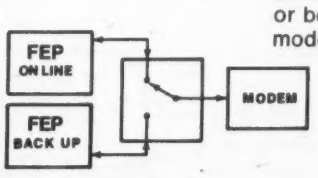

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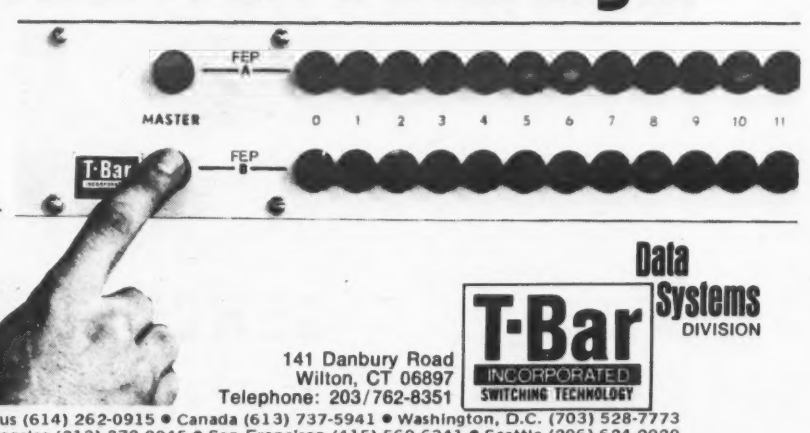

T-Bar Universal Fall Back Switches have been used successfully to switch various Front End Processors, including IBM 3705, IBM 270X, UNIVAC 1108, Burroughs 5000, Memorex 1270, DEC PDP-11/45.

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Car Dealers Dial Up Emergency Parts on Audio Units

DETROIT – A remote direct order entry system using audio response units has enhanced Ford Motor Co.'s Parts Division's ability to service its customers in emergency situations.

The system is designed for ordering parts not carried in the dealer's stock that are critical for getting a car back into service. Before this system came along, the parts manager at the dealership sent in or called in the order. If a part number was not recorded correctly, it wasn't detected until the order was entered into the computer where it was rejected. Out-of-stock items were not identified until the order was processed.

These conditions remained unknown to the parts manager until the order was received at the dealership and the part numbers were red lined on the packing slip. The customer was therefore required to be without his car for a longer period of time while the error was being corrected, resubmitted and filled properly.

Today, with over 850 Transcom Audioport-160 audio response terminals in the New York, Detroit, Chicago and Los Angeles areas, the parts manager enters the order directly into a computer in one of Ford's major distribution centers throughout the U.S. over the normal telephone dial-up system. Stored in each computer are approximately 250,000 part numbers and the status of each part. As each part number is entered, verification of the stock status of the part is given verbally through the terminal. He is also "told" when an incorrect part number is entered.

A customized keyboard on the terminal enables the parts manager to request a repeat of the last message, to verify the part number just entered or cancel a part number entered by depressing a key.

Statistics on one district show an average of 350 calls (orders) are made per day into the system. The number of line items averages from 7,500 to 8,000 per day and the average rate of entry per line item is 17.8 seconds. As experience increases, the time per line item falls. Some dealers who enter sizable orders are averaging 8 seconds per line item.

Each distribution center has a Burroughs B2500 computer. The Burroughs audio response unit attached stores 128 words. There are 22 lines being serviced by the computer using Bell 401J data sets on a rotary for the interface.

Transmission is accomplished using the frequencies generated directly out of the Audioport-160 terminal. The terminal itself is a portable, acoustically coupled unit using an AC or battery power source.

The placement of a typical order would go as follows:

The parts manager dials the system telephone number and places the telephone handset into the acoustic cups on the terminal. When connection is made to the computer, a high tone is heard for a few seconds followed by the audio message, "Distribution center, i.e., Chicago, parts. Enter dealer code."

The dealer enters his identification number and depresses a "send" key. The number is repeated back to him from the computer and then he is requested to "verify." If the number is correct, he merely depresses the "verify" key. If not correct, he reenters it.

"Enter quantity, part number" is the next instruction heard. Various quantities and part numbers are entered and an audio message telling the status of each part is heard immediately after each entry.

Examples of the voice responses are: "In stock" (at the distribution center), "National in stock" (Detroit carries the item in the national warehouse), "Vendor" (stock will be supplied by vendor), "Referred" (the local distribution center is temporarily out-of-stock and items will be referred to the nearest center having stock for forwarding), "Replaced by" (part has been replaced by another part whose number is given along with the new parts status), and "Obsolete" (part is no longer valid and is automatically cancelled).

After all parts are entered, the "end order" key is depressed. The response, "Enter order type, shipping code" is heard. One of two order type keys is depressed ("unit down" for 24-hour response or "critical" for four-hour response) and one of seven shipping type keys is depressed.

The response repeats the two keys that were depressed and asks for "verify." The "verify" key is depressed and the response is, "Your order number is 1-2-3-4-5-Thank you." The call is then terminated.

Most parts managers are enthusiastic about the benefits they are getting from the system.

Three Options Added To Wang 2200 System

TEWKSBURY, Mass. – Three communications options for handling interactive and batch processing operations are now available with the System 2200 computer from Wang Laboratories, Inc.

Depending on the options, a System 2200 can be used to communicate with other 2200s, "foreign" CPUs (IBM, Honeywell, Univac, etc.), TTY models 33 and 35 or other TTY-compatible (8-level Ascii) devices.

In addition to acting as an intelligent terminal for data entry and validation, the System 2200 operates as a stand-alone computer, making it adaptable to a full range of off-line data processing applications in universities, hospitals, banks and engineering departments and general business, Wang said.

Transmission to 1,200 Bit/Sec

The Model 2227 telecommunications controller option allows local or remote asynchronous communication with other System 2200s or remote telecommunications with other CPUs. Transmission over dial-up or leased phone lines equipped with Bell 103A3 or equivalent data sets is at 110- 300 bit/sec, with the System 2200 appearing as a TTY Model 33 or 35. When linked directly (within 50 ft.) to another System 2200, transmission can be up to 1,200 bit/sec. The 2227 is $900.

With the Model 2250 I/O interface controller option, transmission of data between System 2200s linked directly (within 100 ft.) can be at a rate of 10,000, 8-bit char./sec asynchronous. The option is priced at $400.

The Model 2207 I/O interface controller option allows direct asynchronous input and output of data between a teletypewriter or other 8-level Ascii device and a System 2200 terminal. Laboratory or medical instrumentation which is RS 232C and 8-level Ascii-compatible can be supported with operation at 110 bit/sec full duplex. The option cost is $300.

The firm is at 836 North St., 01876.

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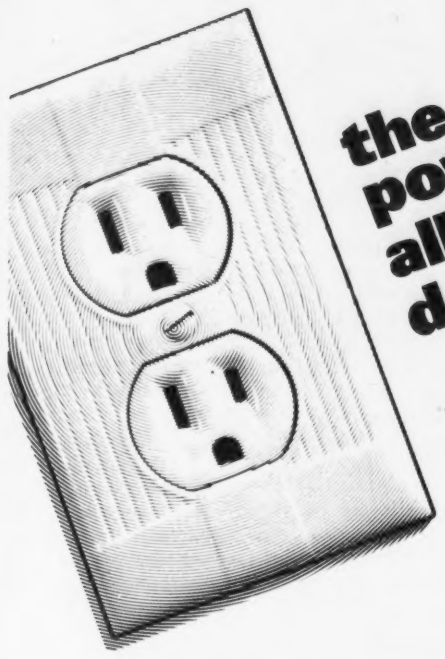

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Service to Begin in August

WU Domestic Satellite Launched

MAHWAH, N.J. – Western Union's Westar, the first domestic communications satellite, has been launched successfully and is now scheduled to begin providing service to data and other users in August 1974.

The satellite was launched for Western Union by Nasa on April 13 and is the first satellite specifically designed to serve users in the Continental U.S., Hawaii and Puerto Rico.

A second Westar to backup the first satellite is scheduled to be launched in June.

The system will be controlled from five earth stations. The control station at Glenwood, N.J., will command the satellite and serve users in the New York area, a station in Alabama will bring signals to users in the Atlanta area, the Wisconsin station will serve Chicago users, and two other earth stations are located outside Los Angeles and Dallas.

Launching of the Westar satellite culminated a process begun in 1966 when Western Union filed its first application for domestic satellite service. Some U.S. users are currently being served by satellite channels on Canada's Telesat satellite but its orbit does not allow for service to all U.S. areas.

The Westar satellite includes 12 transponders which can handle 50M bit/sec of data communications traffic. It is expected that satellite service will eventually provide users with lower rates than present terrestrial services because satellites are essentially distance insensitive.

DEC Graphics Terminal Expandable

MAYNARD, Mass. – An expandable version of the GT40 graphics terminal, the GT42, has been introduced by Digital Equipment Corp.

With a 17-in. viewing screen, the GT42 is designed for interactive graphic applications such as architectural design, computer-aided instruction, molecular modeling and industrial control/monitoring. The GT42 can be used as a stand-alone graphics system or as a terminal interacting with various types of host computers.

The terminal is configured around the PDP-11/10 minicomputer and features a hardwired graphics processor that drives the CRT. The display processor unit performs the most used graphical techniques with low CPU overhead.

A light pen, full Ascii keyboard and character set with 31 special mathematical and scientific symbols, and a serial communications interface are standard on the GT42. The terminal costs $17,500.

Test Set Monitors Interface

PROVIDENCE, R.I. – The Model 60 EIA interface monitor and breakout panel from International Data Sciences, Inc. is a portable, pocket-size test set providing access to all 25 conductors of the EIA RS 232 interface.

Twenty-four miniature switches allow all interface conductors (except frame ground on pin 1) to be individually interrupted allowing isolated testing and observation of terminal or modem signals.

The unit is powered by two penlite batteries capable of over 100 hours of continuous operation. The units costs $135 from 100 Nashua St., 02904.

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Potter Enhances Diskette System With Line Printer

MELVILLE, N.Y. – Potter Instrument Co. has added a 525 line/min printer to its IBM-compatible floppy disk data entry system.

The LP6350 impact printer, coupled with the IBM 2780-compatible communications capability of Potter's System 85 diskette data station, will allow the station to be used as a remote line printing device.

A full diskette holding the equivalent of up to 3,000 punch cards can be printed in less than four minutes with the printer which is priced at $4,950, from the firm at 532 Broad Hollow Road, 11746.

Fixed and Removable Floppies Combined for Minicomputers

SANTA ANA, Calif. – Intelligent Memory Systems, Inc. (IMS) has combined a fixed-head floppy disk and a removable floppy disk into the MU/300 Series of minicomputer memory systems.

Both drives use non-contact read/write and start/stop techniques.

Average access time is under 17 msec, and controllers are available for DEC, Data General, Computer Automation and Datapoint minicomputers. Storage capacities range from 16K bytes to 100K bytes and the units are priced from $725 excluding controller. The firm also has reduced the price of the MU/200 fixed-head floppy disk from $1,615 to $1,250. IMS is at 2165 S. Grand Ave., 92705.

Calcomp Microfiche System Offers All Equipment for $100,000

ANAHEIM, Calif. – Calcomp's standalone microfiche management system accepts line printer magnetic tapes from any computer and produces 105mm microfiche. The system consists of a Calcomp 2100 alphanumeric COM recorder, 925 stored program controller and a teletypewriter console. The system is priced at $100,000 including one year's maintenance. California Computer Products, Inc. is at 2411 W. La Palma Ave., 92801.

Minicomputer Tape Drive Uses 3M Tape Cartridge at 1,600 Bit/In.

PLAINVIEW, N.Y. – The Qantex 600 tape drive uses the 3M DC300A tape cartridge with data recorded in up to four tracks at a density of 1,600 bit/in. phase-encoded, and at 30 in./sec. This yields a data transfer rate of 48 kbit/sec, according to the firm.

The Model 600 also operates at 90 in./sec in bidirectional high-speed search.

Prices for the unit start at $300 with minicomputer interface electronics extra.

The firm is at 200 Terminal Drive, 11803.

Reconfigured CMC Key-to-Disk Has Lower Price, Less Features

MARINA DEL REY, Calif. – Computer Machinery Corp. (CMC) has taken its top-of-the-line CMC 18 key-to-disk data entry system, eliminated a few features, unbundled some of the software, but dropped the lease price on the basic system by $1,200/mo to give users a CMC 16 Keyprocessing system.

Instead of the 64-keystation capability of the CMC 18 the CMC 16 has 32-station capability; disk capacity maximum is lower; and there is no RPG II programming capability as on the CMC 18.

The price drop from $2,500/mo to $1,300/mo, however, does give the user a sizeable compensation even though some software either has to be designed by the user or bought separately. The price drop also makes it more feasible for large users to duplex two systems to insure continuity of operation if any mechanical problems arise.

Security

Two systems of 32 stations each, for example, can be used to insure that at least half will be in operation continuously, whereas in a 64-station system everything will stop with a machine failure.

The CMC 16 with communication options can also serve as a pooling device to accept batches of data from smaller CMC key-to-disk systems or IBM 2780-compatible devices including IBM 3742 floppy disk units. And, in turn, the CMC 16 can serve as a remote batch processing/remote job entry terminal for a host CPU.

Using compatible binary synchronous protocol, a communication-equipped CMC 16 sends and receives batches of records at up to 19,200 bit/sec. The CMC 16 software includes the typical foreground edit routines as well as a performance monitor.

Hardware

The hardware for the CMC 16 consists of a supervisory console, disk unit with a standard capacity of 50,000, 80-character records, expandable to 150,000 records; industry-standard tape options, choice of either CRT keystations or panel display units, supervisory teleprinter, with optional 132-column line printers and card readers available.

The typical 16-station, including stations, CMC 16 leases for $3,440/mo with maintenance on a two-year contract and has a purchase price of $137,000. Additional terminals lease for $70/mo from the firm at 2500 Walnut Ave., 90291.

The Tape Game Not Very Tame

GRAHAM, Texas – Users looking for computer tape in the past years had it easy. Most just bought tape every year and dumped the old reels before they became a problem – but now tape has become a major acquisition process and tape manufacturers are providing tape quality.

Every new tape offered has to have a gimmick as well as a "lasts forever" label.

So also does Graham Magnetics' new Omega 80 half-inch tape which at first glance is too good for most recording densities presently in use. The Omega 80 has a theoretical recording density "as high as 80,000 flux reversals per inch" – which is just fine for future use on 6,250 bit/in. tape drives. Graham also claims that after exposure to a temperature of 160 degrees at 85% relative humidity for 144 hours this tape can last three million passes without error.

The firm claims a life expectancy of up to 100 years, or, in other words, until there is no need for tape drives anymore.

Omega 80 is priced at $30 per 2,400-foot reel from the firm here.

Uses 4K Memory Chip

HP 21MX Minis Offer More Microprogramming

By Vic Farmer
Of the CW Staff

PALO ALTO, Calif. – Several weeks ago at the introduction of the Control Data Cyber 170, some of the CDC engineers talked about their selection of the 1K-bit random access memory (RAM) integrated circuit chips over the latest 4K RAM circuitry.

For CDC, at the time it designed the Cyber 170 Series, the 4K RAM was just not good enough, but Hewlett-Packard had a shorter development time for its new 21MX Series of minicomputers, the 2105 and 2108s, and made full use of the packaging density the 4K circuit allows. CDC, meanwhile, hinted it was seriously looking at the 4K RAM chip for other computers in its own line.

The 4K RAM chip has just recently become practical for mass production and HP is one of the first minimakers to get a product incorporating the denser circuits to the users. First shipments are expected in June.

The HP 2105A and HP 2108A are priced about 30% less than comparable models in the HP 2100A line and much of this cost reduction results from the use of the 4K RAM chip. Both of the new minis have a choice of two different memory systems and are fully microprogrammed with an internal 24-bit control processor. Memory parity and extended arithmetic unit are standard on both.

The 2105A is 5-1/4 inches high but can contain 32K 16-bit words of memory, in addition to four powered I/O channels. The 2108A, which is 8-3/4 inches high, has nine powered I/O channels and space for a 32K memory, expandable later this year to 64K, all within the mainframe, according to HP.

These new units are compatible with earlier HP 2100 minicomputers, for the entire instruction set of the 2100 is microprogrammed within the new mini's processor control address space, HP said. This emulation of the earlier processors occupies only one-eighth of the new units' much enlarged processor control address space, and HP claims that 2100 programs suffer no degradation under emulation on 21MX Series.

The control processors are user microprogrammable with a control address space for 4K, 24-bit words, and 14, 16-bit hardware scratch registers. A user can tailor microroutines using writeable control store or programmable read only memory (Prom) options.

Four different ROM stored programs can be loaded from the front panel.

One of the unusual features of the 21MXs is a greater tolerance for short power failures of up to 10 cycles. The units will maintain normal operation, also, if the line voltage drops to 88 V. Line frequency may vary from 47 Hz to 66 Hz.

Under program control, a dual-channel port controller will connect any two 2100-compatible peripherals directly to the memory system. The two-channel selector, which is an addition to the direct memory access (DMA), contains control logic, memory address and word count register not contained in the DMA facilities normally found in other minis, HP said.

Any of the peripherals attachable to earlier HP processors can be plugged into the 21MX Series computers through the powered I/O channels, HP said.

HP cautions that for the next several months the 21MX Series will only be sold in lots of five or more minis, and under this restriction the price of the 2105A with 16K memory will be about $7,400 each; with 32K memory, $11,200. The 2108A processor, with the same memory system but with more I/O channels, is $920 more. HP is at 1501 Page Mill Road, 94304.

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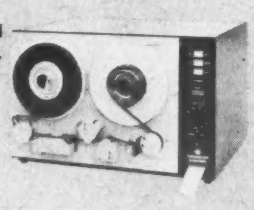

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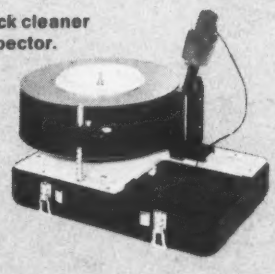

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COMPUTER-LINK CORPORATION
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The Prime Computer User Plan brings common sense to buying a computer. It recognizes the simple fact that your needs might change someday.

The Plan introduces the first two-year guaranteed trade-in policy. It details the upward and downward compatibility features only Prime offers. In short, it gives every assurance you can always put a Prime system to use.

We consider The Plan a new way to buy, use and upgrade computer systems. We also give you the systems to consider: The Prime 100, 200 or 300. The chart below is a preview of what to expect in each.

Standard Processor Features	
Prime 300 Central Processor (1 board)	• Virtual Memory – automatic paging, mapped address translation to 256K words, restricted execution mode, and memory protect. • Stack Procedure Instructions • Micro Verification Routines** • Hardware Multiply/Divide and Double Precision Arith.* • DMC/DMT Capability* • Automatic Program Load From Input Devices (PTR, TTY, CR, MT, Disk)*
Prime 200 Central Processor (1 board)	• Memory Byte Parity • Processor Byte Parity • Full Addressing Modes – direct, indirect, and indexed in both sectored and relative modes • Virtual Instruction Package (VIP) – automatic trapping of unimplemented instructions and substitution of functionally equivalent software subroutines.
Prime 100 Central Processor (1 board)	• 8-Channel Programmable DMA • 4 Channel Full Duplex Asynchronous Serial Interface • Multi-level Vectored Priority Interrupt System

* Optionally available on Prime 100 and 200
**Optionally available on Prime 200

The chart suggests there's a little 300 in every Prime computer. Naturally, we planned it that way. Our 300 is just the reverse of the big box with a little computer inside.

Other 300 features will tell you just how big it is. For instance, there's high-speed MOS memory with 32K words per board. Up to 256K words per system. There's floating point arithmetic and writable control store, too. In short, there's everything you'll need in the computer you can plan with. Work out a multi-function system or plan a multi-user arrangement. The diagram that follows is just one way to go.

The Prime 300 supports a multi-user, virtual memory Disk Operating System (DOS VM) and a foreground/background Real Time Operating System (RTOS VM).

A Prime 300 with virtual memory easily accommodates over a dozen users. What's more, each is guaranteed 64K words of virtual memory available to program in FORTRAN, BASIC, Macro Assembler and Micro Assembler.

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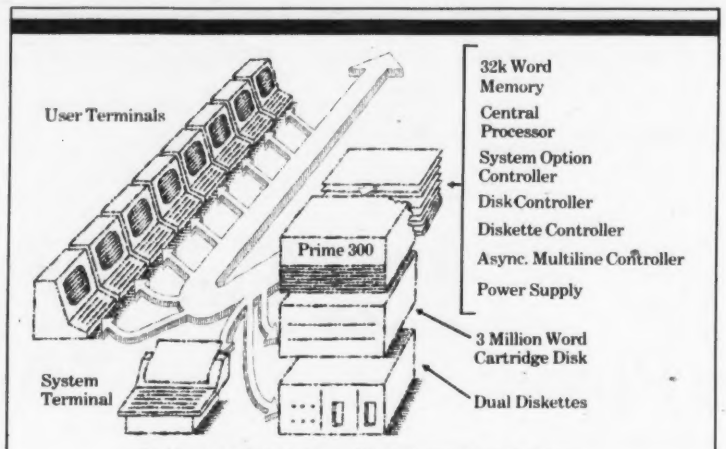
The Plan also goes into system integrity features. Memory Byte Parity and Processor Byte Parity are standard in the Prime 300. Micro-verification routines (also standard) and controller loop-back allow you to isolate faults to a single board.



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PRIME

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Show Promises Broad Appeal for Users, Industry

CHICAGO – With over 35,000 attendees expected, a record number of technical sessions and the largest equipment display in years, the National Computer Conference here next week promises to provide topics of interest to both users and computer industry personnel alike.

The show, which is expected to be almost as large as the Joint Computer Conferences of the late 1960s, opens its five-day run in McCormick Place here on Monday, May 6.

Sponsored by the American Federation of Information Processing Societies (Afips), this year's show is the second once-a-year conference, replacing the traditional twice-a-year format, outmoded with last year's get-together in New York City.

The record 119 technical sessions planned under the direction of Dr. Stephen S. Yau, chairman of the Computer Sciences Department of Northwestern University, will place heavy emphasis on the application of data processing technology – with 10 themes devoted to applications in major areas of industry and business. Descriptions of the panels and papers to be presented, along with a full schedule, appear in the following pages.

Social issues will also be covered in a special program, even though to a lesser extent than in the past.

This reflects a move from the broad problem definition sessions of the past, since many of the applications sessions will feature talks on how to overcome some of the social problems discussed in past conferences.

This year's exhibit will be the largest in years, probably only topped in number of exhibitors and booths by the 1969 Fall Joint Computer Conference in Las Vegas.

The exhibit area will continue to show a strong OEM emphasis, even though there will apparently be more end-use products on display than evidenced in some recent shows, organizers said.

Take a Work Break: Trips, Films, Fair

CHICAGO – NCC attendees will have a variety of special activities to choose from in addition to the work sessions.

A conference reception will be held Monday from 6-8:30 p.m. at the McCormick Inn.

"Oklahoma Night at the NCC" features a production of the play "Oklahoma" with John Davidson in the leading role.

During the first four days of the conference, films depicting computer-oriented subjects will be screened in the Science Theatre located in the Ray Schoessing Hall in McCormick Place.

Computer arts and related video and audio technology will be explored by "Video I/O," a computer art show.

A Computer Fair for high school students will include entries in the categories of new applications of computers, programming, design and construction of computers or components and mathematics of computation.

Four tours to local user sites including the Chicago Police Department have also been arranged for attendees.

Communications Dominates Product Offerings

CHICAGO – Communications products and terminals will highlight the exhibit area of the 1974 National Computer Conference here next week – at least in numbers of products shown.

At the same time, there will also be a heavy emphasis on peripheral products and minicomputers, with a smattering of software firms and few large mainframes on the floor.

The exhibit – in which more than 250 firms will be showing their wares in over 810 booths – will be open in McCormick Place from 11 a.m. to 7 p.m. on Monday, May 6, and from 10 a.m. to 6 p.m. from Tuesday through Thursday.

The large mainframers on the floor will be headed by IBM, which will be exhibiting the 3600 finance system, Control Data Corp. and Xerox Data Systems, with the other major mainframers continuing to shun the annual show.

However, almost all of the minicomputer makers will be represented during the five-day meeting, emphasizing the growing user interest in distributed computing and network applications.

The large number of terminal makers exhibiting at the show also emphasizes the users' growing interest in communications networks, as does the high number of firms showing such equipment as modems and multiplexers.

As in past conferences, however, there will be a large contingent of OEMers on the floor – with probably close to 50% of the exhibits devoted to this interindustry type of display.

Many of the minicomputer makers will be showing both end-user devices and their OEM lines, and a large portion of the peripherals display area will be given over to demonstrations of equipment destined to be incorporated in end-user systems.

In fact, many of the peripherals makers who in past years had been moving into the end-user area with large displays will show some retrenchment in their operations with most of their exhibits devoted to the OEM market.

The following pages contain descriptions of many of the exhibits to be found on the convention floor.

ACM Committees, Sigs to Meet Throughout Week

CHICAGO – A wide range of activities has been planned for ACM members, with meetings scheduled before, during and after sessions of the NCC program.

The ACM Executive Council is scheduled to convene three times in meetings chaired by Anthony Ralston. The council will meet all day Thursday May 9, beginning at 9 a.m., with a break from 5-8 p.m., and reconvene Friday at 9 a.m.

Also on Thursday, the Professional Standards & Practices Committee will meet from 2-5 p.m. From 8-11 p.m. there will be a Sigplan Business/Technical meeting.

ACM special interest groups and committees have scheduled meetings from Monday through Thursday, beginning with a Sig/Sic board meeting Monday form 2:30-5:30 p.m. SigCOMM will meet from 4:00-5:30 p.m.

Meetings on Tuesday include the SigCSE business meeting from 9-10:30 a.m., and the newly formed SicMini group will hold its first business meeting from 10 a.m. to 12 noon.

On Wednesday, 7:30-9 a.m., the SigBDP will have a technical meeting. From 10 a.m.-12 noon SigCUE will hold a combined business and technical meeting. SigCAS and SigDA will both meet from 4-6 p.m.

The ACM Standards Committee is scheduled to meet Monday afternoon from 2:30-5:30, with the Priorities and Resources Committee gathering from 4-6 p.m.

On Tuesday from 8-9:30 a.m. there will be a meeting of the Computers and Public Policy committee. Other meetings on Tuesday include the Secondary School Program committee, 2:30-4:30 p.m., and the Professional Standards & Practices committee, 2:30-5:30 p.m.

Also on Tuesday, from 4:30-6:30 p.m., both the Community/Junior College and the Ombudsman committees will hold meetings. From 7-8:30 p.m. Jean Sammet will chair a member-officer forum.

The Curriculum Committee on Computer Science is scheduled to meet on Wednesday, 9 a.m. to 1 p.m., and the Education Board from 1-3:30 p.m. The External Activities Board will hold its meeting on Wednesday from 1:30-3:30 p.m.

On Thursday, the ACM Curriculum Committee on Computer Education for Management convenes from 8-10:30 a.m.

What's the Forecast?

CHICAGO – Find room in your baggage for a raincoat and leave your summer duds at home if you are planning to attend the NCC here next week.

While the average temperature in Chicago in the early part of May is approximately 58 degrees, the Windy City can live up to its title and the temperatures can be on the cool side in the evenings and at night.

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NCC Sessions Provide Opportunity for In-Depth Study

CHICAGO – National Computer Conference session attendees will have ample opportunity to examine any one of a number of topics in depth. Sessions are arranged into 15 major subject areas, 10 of which are on industry applications and five on computer science and technology.

Where possible, sessions in each subject area are being held in the same general location to minimize attendee traffic.

Sessions will be held in both McCormick Place and McCormick Inn, and are designated below by Place and Inn.

Afternoon sessions on Monday and Thursday begin at 1:15, whereas on Tuesday and Wednesday they start at 2:30.

Not included in the session schedule below, but very much a part of the conference, are several addresses by industry and government figures.

George Glaser, president of the American Federation of Information Processing Societies (Afips), will deliver the keynote address at the opening of the conference Monday at 10:30 a.m.

On Tuesday, Clarence W. Spangle, executive vice-president of Honeywell, Inc., will give the conference luncheon address at 12:15 p.m.

Wednesday, John D. deButts, chairman of the board of AT&T, will speak at the industry luncheon, also at 12:15.

Thursday, featured speaker Vice-President Gerald Ford will address the NCC on the subject of privacy at noon in the Aerie Crown Theater, McCormick Place. Ford is chairman of the Domestic Council Committee on the Right of Privacy.

Monday

1:15–3:13

1. Associative Processing – *William W. Patterson* – 42 2W, Place
2. Applications & Extensions of the Tenex Operating System – *Jerry D. Burchfiel* – V-VI, Inn
3. Advances in Data Base Management – *P. Bruce Berra* – 66 W, Place
4. Information Systems for Health Care – *Stanley Y.W. Su* – 42 3W, Place
5. Technology Aids for the Physically Disadvantaged – *Mort A. Rahimi* – I-IV, Inn
6. C-COMP Communications Oriented Manufacturing Plan: "A Paper-Less Factory Approach" – *Theodore A. Bakalar* – 20 8W, Place
7. The EDP Management Process – Visibility or Vulnerability – *Joseph A. Lev* – Levine Auditorium, Place
8. Transferability of Govt. Information Systems, Problems & Solutions – *Verne H. Tanner* – Yau Auditorium, Place
9. DP in Transportation – General Overview of Applications – *Paul G. Mercer* – VII, Inn

3:30–5:30

3. (Session continues)
6. (Session continues)
10. Computers in Communications & Voice Recognition – *Lotti A. Zadeh* – 42 2W, Place
11. Operating Systems I – *R. Stockton Gaines* – V-VI, Inn
12. Utility Computing: A Superior Alternative? – *George J. Feeney* – Levine Auditorium, Place
13. Information Systems for Ambulatory Care – *Anthony I. Wasserman* – 42 3W, Place
14. Recent Developments & Applications of CAI – *William M. Richardson* – I-IV, Inn
15. Federal Activities in Information Processing – *John Gentile* – Yau Auditorium, Place
16. Communication Nets in Transportation – *Dan Couchenour* – VII, Inn

Tuesday

8:45–10:15

17. Intelligent Terminals – Rationale & Implications – *Linder Charlie Hobbs* – 42 2W, Place
18. Operating Systems II – *Peter J. Denning* – V-VI, Inn
19. Structured Systems Development – *Jack Shaw* – 20 8W, Place
20. Health Care Planning & Acceptance of Computer Systems – *Michael D. Dunn* – 42 3W, Place
21. The Use of Computers for Instruction and Admin. in Elem. & Second. Education (AEDS) – *Sylvia Charp* – I-IV, Inn
22. On-Line Systems, Vision or Reality? – *Gene Laguban* – 66W, Place
23. What Manufacturers Would Like to See Happening in POS (1) – *Gerald T. Montgomery* – Levine Auditorium, Place
24. Law Enforcement – *Glen Pommerening* – Yau Auditorium, Place
25. Operating Control Through Computer Sciences – *Gerald C. Durand* – VII, Inn

10:30–12:00

26. The Effect of Changing Technology on Computer Graphic Systems – *Phillip P. Damon* (SID) – 42 2W, Place
27. Current Trends in the Software Products Industry – *Martin A. Goetz* – V-VI, Inn
28. Large-Scale Computer Network Experiences – *David P. Jasper* – Yau Auditorium, Place
29. Computer Output to Microfilm – *John F. Ridgeway* – 20 8W, Place
30. Terminal Hardware & Methodology in Hospital Information Systems – *Stanley E. Jacobs* – 42 3W, Place
31. Business Data Processing Education: A Decade of Failure – *Thomas J. Cashman* – I-IV, Inn
32. Equipment Monitoring & Information Use – *Stanley Hyduk* – 66W, Place
33. What Manufacturers Would Like to See Happening in POS (2) – *Gerald T. Montgomery* – Levine Auditorium, Place
34. Equipment Control in Transportation – *Fred R. Blugge* – VII, Inn

2:30–4:30

35. Display Processing & Technology – *Bruce McCormick* – 42 2W, Place
36. A Large Real-Time System Development – *Michael P. Fabisch* – V-VI, Inn
37. Codasyl & Guide/Share Proposals on Data Base Management Systems – *Larry Simonette* – Yau Auditorium, Place
38. Management Impact of Networks – *Einar Stefferud* – 20 8W, Place
39. Applied Medical Applications – *George E. Gantner* – 42 3W, Place
40. University Computer Science Education: Some Interesting Recent Developments – *Dick B. Simmons* – I-IV, Inn
41. Problems, Perils & Promises of Computer Graphics – *Lawrence Rosler* – 66W, Place
42. What Manufacturers Would Like to See Happening in POS (3) – *Vernon L. Schatz* – Levine Auditorium, Place
43. Computerized Transportation-Distribution: A User Overview – *Jack Farrell* – VII, Inn

4:45–6:45

36. (Session continues)
37. (Session continues)
41. (Session continues)
44. System Implementation Techniques – *Mario J. Gonzalez* – 42 2W, Place
45. Network Interfaces – *Ralph Alter* – 20 8W, Place
46. Computer Science Education: Recommendations for Change – *Julius A. Archibald* – I-IV, Inn
47. What Manufacturers Would Like to See Happening in POS (4) – *Vernon L. Schatz* – Levine Auditorium, Place
48. Computer Developments & Applications Outside the U.S. – *Richard I. Tanaka* – 42 3W, Place

Wednesday

8:45–10:15

49. Mathematical Software: Patterns for the Future (Siam) – *John R. Rice* – 20 8W, Place
50. Networks of Minicomputers – *David Farber* – Yau Auditorium Place
51. Humanization of Information Systems – *Peter Lykos* – I-IV, Inn
52. The High Cost of Software: Causes & Corrections – *James H. Burrows* – Levine Auditorium, Place
53. Large Information Processing Networks: Development & Operational Experience – *Howard Frank* – 42 2W, Place
54. Computer Algorithms for Analyzing Patient Data for Diagnosis and/or Therapy – *Jonathan Clive* – 42 3W, Place
55. Numeric Control Machine Tool Technology & Applications – *James Warner* – VII, Inn
56. Economic Motivation of POS – *Harry Schreiber* – V-VI, Inn
57. Computers & Personal Privacy: A Major Societal Issue – *Willis H. Ware* – 66W, Place

10:30–12:00

57. (Session continues)
58. Artificial Intelligence & Related Topics – *W. Douglas Maurer* – 20 8W, Place
59. Computer Networking: The User's Viewpoint – *Thomas N. Pyke Jr.* – Yau Auditorium, Place
60. Improving Computer System Effectiveness – *Ugo O. Gagliardi* – Levine Auditorium, Place
61. Domestic Satellite Services & Their Impact on Information Processing Networks – *Robert Kahn* – 42 2W, Place
62. Computer Simulations of Aspects of the Diagnostic Process – *Max A. Woodbury* – 42 3W, Place
63. Manufacturing Information Systems – *Earl Gomersal* – VII, Inn
64. Impact of POS on Data Communications – *George E. Buchik* – V-VI, Inn
65. Hardware & Software Concerns Relating to Industrial Processes – *Henry R. Koen* – I-IV, Inn

2:30–4:30

66. Operation Status of Large-Scale Data Processors – *Richard E. Merwin* – Levine Auditorium, Place
67. Software for Computer Systems Acquisition – *Paul Oliver* – 20 8W, Place
68. Effective Use of Computers – *Marvin M. Wofsey* – I-IV, Inn
69. Minicomputers in Data Communications – *Wesley Chu* – 42 2W, Place
70. The Prophet System: Computing in Pharmacology – *William F. Raub* – 42 3W, Place
71. Manufacturing Control System – *B. Garland Cupp* – VII, Inn
72. Voluntary Standards for Retailing – *Irving I. Solomon* – V-VI, Inn
73. Security, Privacy & the Information Processing System – *Kenneth Orr* – 66 W, Place
74. Dartmouth Time-Sharing System: Then & Now – *Thomas Kurtz* – Yau Auditorium, Place

4:45–6:45

74. (Session continues)
75. Microprogramming Technology – *Michael Galey* – Levine Auditorium, Place
76. Security Kernels – *Steven B. Lipner* – 66W, Place
77. Computer Center Management – *Barry L. Bateman* – I-IV, Inn
78. Planning & Design of Data Communications Networks – *Wushow Chou* – 42 2W, Place
79. Shop Floor Control – *James O'Toole* – VII, Inn
80. Automated Warehousing – *Don Evensen* – V-VI, Inn
81. Cooperative Government Utilization of Information Processing Systems – *Leonard Stitelman* – 42 3W, Place
82. Applying Computers in the Research & Development Laboratory – *John R. Kosorok* – 20 8W, Place

Thursday

8:45–10:15

83. Architectural Parameters – *C.V. Ramamoorthy* – 42 2W, Place
84. Programming & Programming Languages – *Saul Rosen* – Yau Auditorium, Place
85. Hierarchical Networks – *Robert L. Ashenhurst* – Levine Auditorium, Place
86. Report on IBM Security Study – *Lee Danner* – 66 W, Place
87. Technology Investment Management – *Jo Ann Lockett* – 42 3W, Place
88. Installing an On-Line System in a Manufacturing Environment – *Thomas J. Archbold* – V-VI, Inn
89. Store Ordering Systems – *Don Evensen* – VII, Inn
90. Guidelines for EDP Evaluation for Banking – *Murray L. Richards* – I-IV, Inn
91. Computer System Design Considerations for Control Applications – *William D. Tabachnik* – 20 8W, Place

1:15–3:15

92. Mass Memory Systems – *John C. Davis* – 42 2W, Place
93. Snobol Languages – *Ralph E. Griswold* – 42 3W, Place
94. Network Performance Measurements – *Leonard Kleinrock* – Levine Auditorium, Place
95. Audit Considerations of Data Bases – *Richard A. Nerad* – 66 W, Place
96. Charge-Out Systems for Management Acceptance & Control of the Computer Resource – *Richard L. Nolan* – Yau Auditorium, Place
97. Computer-Based Career Guidance & Planning – *JoAnn Harris* – I-IV, Inn
98. Point-of-Sale Systems for Supermarkets – *Vernon L. Schatz* – V-VI, Inn
99. The Terminal Systems Applications in the Financial Community – *Richard Haynes* – VII, Inn
100. Selected Topics on System Simulation & Interaction – *William D. Tabachnik* – 20 8W, Place

3:30–5:30

98. (Session continues)
101. Advances in Memory Technology – *Joseph Kruy* – 42 2W, Place
102. Programming Debugging – *Helene E. Kulsrud* – 42 3W, Place
103. Standards for Computer Networks – *Ira W. Cotton* – Levine Auditorium, Place
104. Research in Data Security: Policies and Projects – *Robert F. Mathis* – Yau Auditorium, Place
105. Continuing Education & Career Development for Computer Professionals – *Paul D. Oyer* – I-IV, Inn
106. Electronic Funds Transfer & Check Collection Developments – *George Mitchell* – VII, Inn
107. Energy In An Evolving Society – *Paul F. Donovan* – 66 W, Place
108. Computing & Mathematics in Society (Sims) – *Donald L. Thomsen* – 20 8W, Place

Friday

8:45–10:15

109. Data Base Administration – *Richard D. Secrest* – Levine Auditorium, Place
110. Accelerating Information Delivery (SLA) – *Don S. Culbertson* – 20 8W, Place
111. Switching & Sorting Networks – *Gerald M. Masson* – 42 2W, Place
112. Continuing Education & Training Through the Use of CAI – *Eugene G. Kerr* – 42 1W, Place
113. Venture Capital for Computer Companies – *Robert F. Johnston* – 42 3W, Place

10:30–12:00

114. Accessing a Data Base Through a Minicomputer – *Charles A. Lupien* – Levine Auditorium, Place
115. Certification of Computing Personnel: Prospects & Potential Impact (ACM) – *Fred H. Harris* – 20 8W, Place
116. Panel on Digital Communications on Cable Systems – *William F. Utlaut* – 42 2W, Place
117. Computing Education for Managers – *James E. Oberg* – Yau Auditorium, Place
118. The Auditor/EDP Manager Relationship (Aicpa) – *Noel Zakin* – 42 1W, Place
119. A Panel Discussion on Computer Communications & the Regulatory Environment – *Sam Levine* – 42 3W, Place

Mohawk Introduces 2300 RJE Terminal To End-User Market

CHICAGO – Mohawk Data Sciences will introduce a new model remote job entry (RJE) terminal to the end user market.

The 2300 RJE system is basically a low-cost version of the firm's 2300 family of communications terminals and a typical configuration would consist of a 4K processor, 230K-byte fixed-head disk, keyboard, CRT display, 300 line/min printer and 300 card/min card reader, the firm said.

Other options for the system include a 30 char./sec character printer, 100 char./sec matrix printer and a 380 line/min chain printer. It could also be configured to include one or two cartridge tape drives, the firm noted.

Mohawk Data Sciences RJE System

Software supports 2780 and 3780 communications and the system costs from $595/mo to $785/mo.

This system, along with the MDS 2300 Document Processing System, will be demonstrated in booth 551 by the firm from Box 362, Utica, N.Y. 13503.

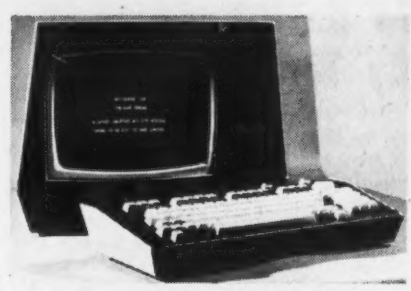
Westinghouse CRTs Go Public

CHICAGO – Westinghouse Canada Ltd. will be showing – for the first time in public – two video display terminals that complement the rest of the firm's line.

The W1620 time-share video terminal, compatible with models 33 or 35 teletypewriters, displays up to 1,920 characters and can receive data at rates of up to 9,600 bit/sec. Options for the W1620 include reverse channel turnaround (202C compatibility), an integral 103A-type modem, automatic answerback, and special models with lower-case or read-only capabilities.

The second unit on display will be the W1600 terminal with a new lower-case capability.

The firm, which can be reached at P.O. Box 510, Hamilton, Ont., L8N 3K2, Canada, will be at booths 941 and 943.



W1620 - Detached Keyboard Version

Car-Mel to Show 'Informer'

CHICAGO – The Car-Mel Electronics D-302 CRT display is a recent addition to the firm's line of Informer terminals and will be shown for the first time in booth 336A.

Capable of transmitting up to 9,600 bit/sec, the unit features protected format, 512-char. display and weighs only 20 lb., according to the firm at 2218 Cotner Ave., Los Angeles, Calif. 90064.

Variety's the Theme At Tektronix Booth

CHICAGO – Tektronix, Inc.'s wide ranging display in booth 431 will feature the first showing of the Tektronix 31/10 interactive graphic calculator.

The 31/10 is a combination of a programmable calculator and a graphic display terminal that is priced at $7,500 complete with software, the firm said.

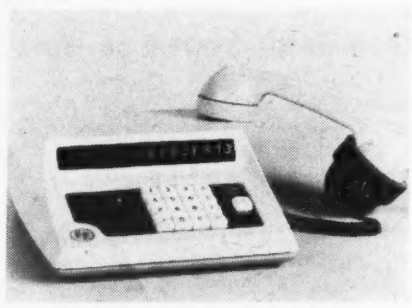
The firm also plans the first public showing of the 4661 digital plotter. The system is designed to present graphic representations from the Textronix 21 or 31 programmable calculators.

In addition, Textronix will show the 4014 and 4015 series of computer display terminals, the 4610 hard-copy unit, the 4010 family of display terminals and peripherals for the unit. The firm, based in Beaverton, Ore., will also demonstrate its line of software support for the equipment.

Interface Technology Plans Touch-Tone-Type Display

CHICAGO – Booth 1126 will house a display of a 16-key and 12-key Touch-Tone-type terminals manufactured by Interface Technology, Inc.

The Model 730 16-key unit is a buffered Touch-Tone-type system for remote data entry and includes a display of up to 16 characters, according to the firm from 10500 Kahmeyer Drive, St. Louis, Mo. 63132.



Interface Technology's Model 730

Princeton Electronics Gets Space for Graphics Unit

CHICAGO – Princeton Electronic Products, Inc. will occupy booths 225 and 227 with an exhibit of its 801 graphic terminal featuring switchable data rates from 110- to 2,400 bit/sec and full- or half-duplex channels.

The unit, with a 10 in. by 10 in. raster tube, also has selective erase and a standard writing speed of 4,000 char./sec, according to the firm from P.O. Box 101, N. Brunswick, N.J. 08902.

Data 100 Readies 'Keybatch'

CHICAGO – The recently developed Keybatch system, which permits users of Data 100 Corp.'s models 74 and 78 remote batch terminals to enter, edit and store up to 5M bytes of data on disk for later batch transmission, will be shown by Data 100 in booth 445.

The firm is at 7725 Washington Ave. S., Minneapolis, Minn. 55435.

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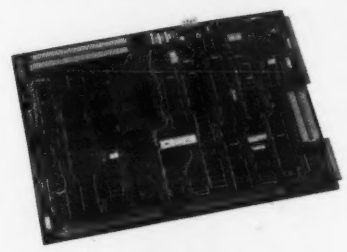

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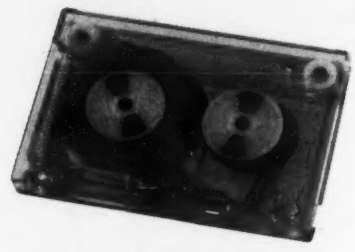

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Hand-Held Terminal To Be Introduced By Termiflex Corp.

CHICAGO – A hand-held terminal that duplicates all the functions of a teletypewriter will be introduced at booth 123 by Termiflex Corp.

The unit, which measures two in. by four in. by seven in., has a 20-key pad which when combined with three special shift keys gives all 128 Ascii characters, according to the firm.

Capable of communication speeds of from 10- to 120 char./sec in full- or half-duplex mode, the unit also comes with its own portable acoustic coupler.

The first in the series with a two-line display of 10 char./line and a 1,000-char. scrolling memory costs $1,570, while a second unit with a one-line display and 500-char. scrolling memory is available fro $1,190. The acoustic coupler for either model sells for $480.

The firm is at 17 Airport Road, P.O. Box 1123, Nashua, N.H.

Termiflex Hand-Held Terminal

Design III CRT Featured

CHICAGO – Booth 1218 will feature a display of the Design III Series CRT display terminal with separate keyboard and video monitor, according to Ann Arbor Terminals, Inc., 6107 Jackson Road, Ann Arbor, Mich. 48103.

Microterm 3302 to Be Unveiled

CHICAGO – A programmable CRT terminal – the Microterm 3302 – will be introduced at NCC by Digi-Log Systems, Inc. in booths 1224 and 1226.

The 3302 displays 1,280 characters in 16 rows of 80 characters each in a 5 by 7 dot matrix arrangement. The keyboard features 54 keys in a Model 33 teletypewriter layout, but is capable of generating the 96-char. Ascii subset.

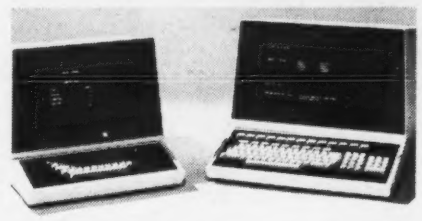
Data rates for the 3302 are selectable from 110- to 9,600 bit/sec and the unit is capable of either half- or full-duplex operation. It also features a character or block mode switch.

In addition, the firm will exhibit the Model 209 TV terminal and the Model 33 interactive CRT terminal. The firm is from Babylon Road, Horsham, Pa. 19044.

System 800 Demonstration Planned by Complanco

CHICAGO – Complanco, Inc. will be demonstrating its new System 800 microprocessor-based CRT and teleprinter terminals with either cassette or core storage in booth 238.

A major demonstration of the System 3700 programmable terminal system, with print speeds from 30 char./sec to 600 line/min, full 80 by 24 CRT and communications speeds up to 9,600 bit/sec., is also planned by the firm, along with a demonstration of the system's operating system. Complanco is at 2350 E. Devon Ave., Des Plaines, Ill. 60018.



Beehive's Busy Bees

The Mini Bee (left) will be featured at booths 244 and 246 by Beehive Medical Electronics, Inc. along with its big brother in the firm's video display line, the Super Bee, the Salt Lake City-based firm said.

Graphic Display Terminal Highlights Imlac Display

CHICAGO – Imlac Corp. will use booth 347 to show its PDS-1G graphics display terminal, according to the firm based at 150 A St. Needham, Mass. 02194.

The intelligent terminal features a 1.8 μsec minicomputer with from 4K to 32K 16-bit words of memory and a display capable of handling 1,450 characters.

In addition to a standard serial asynchronous interface which accommodates data rates of 75 bit/sec to 200 kbit/sec, the unit also offers other interfaces including programmable speed selection, asynchronous and synchronous.

Two software packages designed specifically for graphic applications are available with the unit which comes with a terminal control program for simple graphics and data plotting.

NCC '74 Terminals

Cope Batch System on View

CHICAGO – Harris Communication Systems, Inc. will display a Cope remote batch terminal system consisting of an intelligent remote batch processor, 1,200 card/min reader, 1,500 line/min printer and Cope technical control system in booth 1035.

The system will be shown operating in full-duplex, bisynchronous and "major" emulation protocols, according to the firm from 11262 Indian Trail, Dallas, Texas 75234.

T/S Terminals Set for Show

CHICAGO – The DP-30 MK V, a 30 char./sec impact printing terminal for time-sharing applications, will be shown by Typagraph Corp. in booth 472.

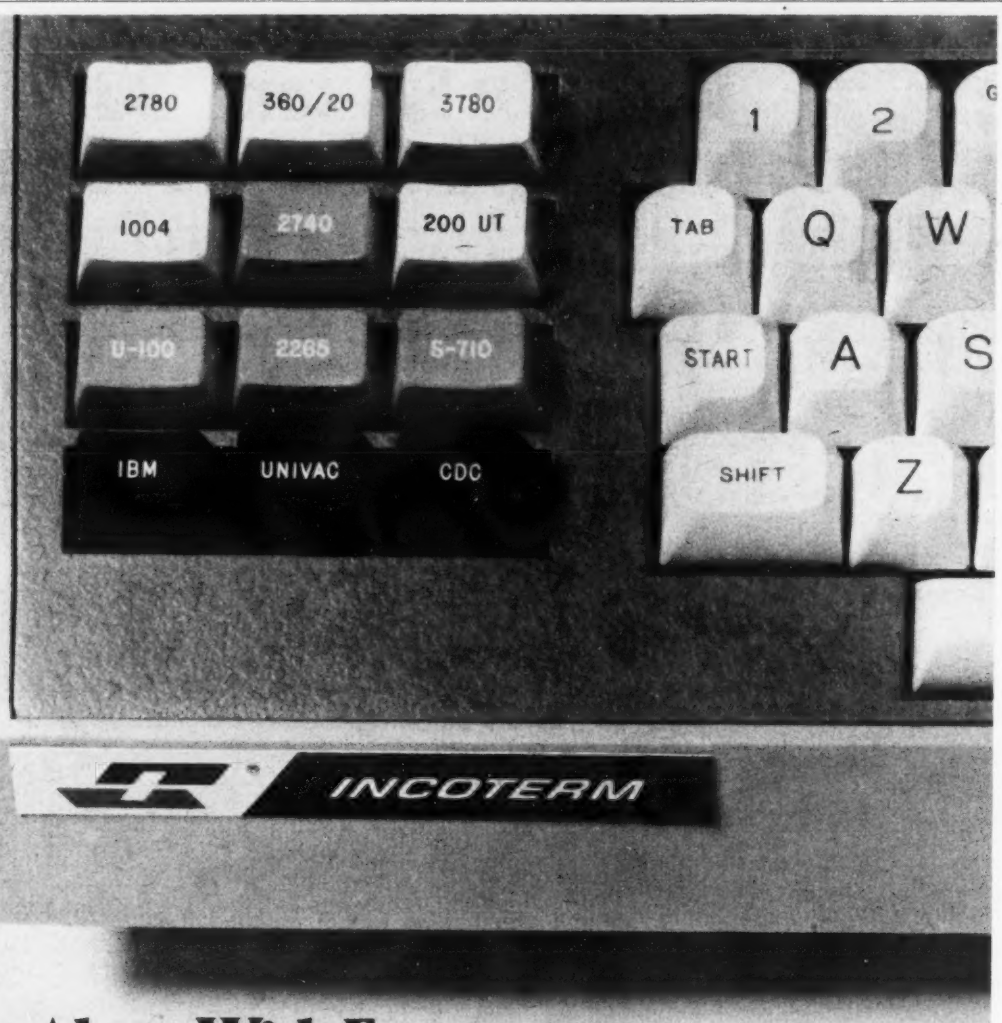
The unit features 132-column width, upper- and lower-case printing, and will be demonstrated with interactive accounting and programming applications, according to the firm at 7547 Convoy Court, San Diego, Calif. 92111.

Teleray 3700 Booth Ready

CHICAGO – The Teleray U/L Series 3700 CRT terminals, priced at $1,795, will be shown by Research, Inc. in booth 266.

The unit, which operates up to 9,600 bit/sec and features left-right cursor, composite video, RS-232 printer output and multiple interfaces, in addition to switchable character sizes, will be shown along with the firm's 3300 Series terminals priced at $1,580.

The firm is at Box 24064, Minneapolis, Minn. 55424.



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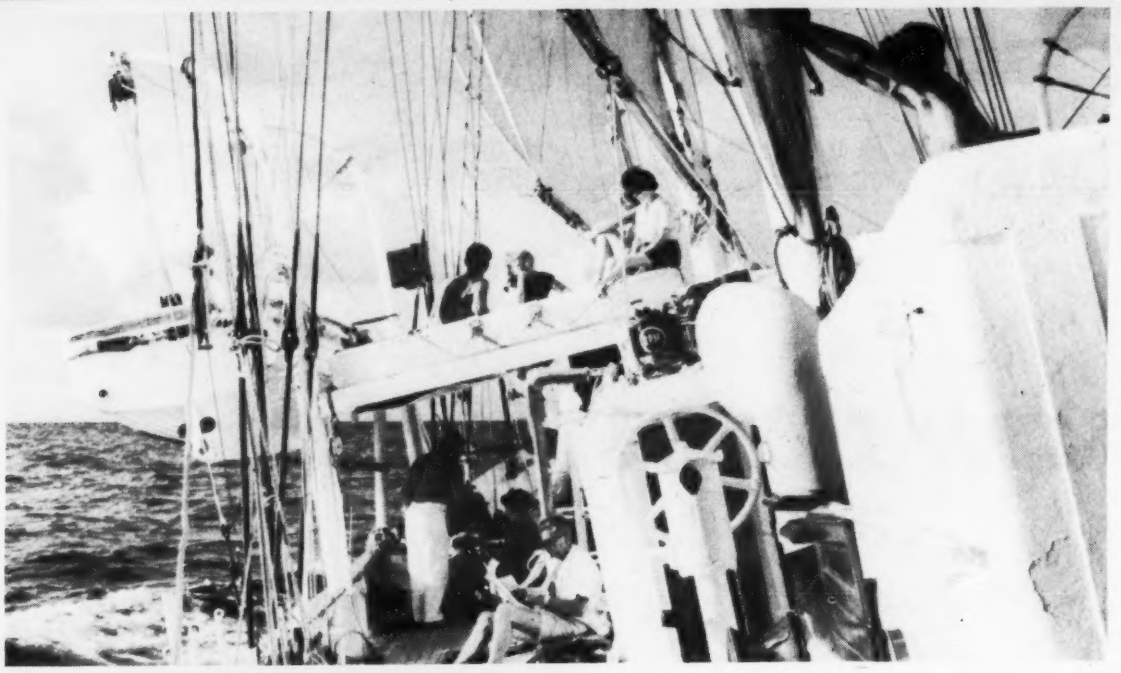

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Kybe Clan of Cleaners Coming

CHICAGO – Highlighting the Kybe Corp. booths 340 and 342 will be two of their newer products: the TMS-70 VI magnetic tape tester for 6,250 bit/in. density tape and the DP-30 disk pack cleaner for 3336- and 2316-type disk packs.

The DP-30 is the third model in Kybe's family of disk pack cleaners and is priced under $4,000.

NCC '74 Storage

The cleaning operation is completely automatic and takes three minutes. All recording surfaces are cleaned by electromechanically operated wiping pads saturated with isopropyl alcohol. The residual cleaning fluid is wiped by a second set of pads and evaporated by filtered ambient air.

The tape cleaner features sapphire cleaning blades said to be capable of cleaning up to 5,000 tapes before they need replacement.

The firm is at 132 Calvary St., Waltham, Mass. 02154.

Kybe DP-30

Kybe TMS-70

EMM Brings Samples Of Add-On Memories For 370/145, Others

CHICAGO – Semiconductor add-on memory for the 370/145 will highlight the Electronic Memories & Magnetics Corp. exhibit, but EM&M will also have samples of its line of core, semiconductor and disk memory products, including a new line of N-MOS memories.

A dynamic display of the Micromemory 9000 core system interconnected between a terminal input device and a digital readout will demonstrate the memory's non-volatility.

The Microram 3000N memory also to be displayed at booth 671 provides a maximum 16K-word by 20-bit memory on a single 11-in. by 15-in. board. Cycle and access times are 300 nsec and 180 nsec respectively, but a higher speed version provides 180 nsec and 150 nsec speeds.

The 3000N is priced at $4,390 from the firm at 12621 Chardon Ave., Hawthorne, Calif. 90250.

6 Products Comprise Calcomp's Exhibit

CHICAGO – Calcomp will display six products at booth 701: the 925/1036 drum plotting system, the 1035 disk drive for large-scale IBM computers, the 8820 magnetic tape system for Univac 400 and 1100 computers, the Century 140 floppy disk drive, the Trident disk pack and the Xytex, XTL on-line magnetic tape storage system which provides the user with automatic tape library control and mounting, dismounting capabilities for up to 32 tape drives.

Calcomp is at 2411 W. LaPalma Ave., Anaheim, Calif. 92801.

Standard Memories Shows IBM Core Replacements

CHICAGO – A line of IBM 360/30, 44 and 50 core memory replacements and expansion memories will be displayed at Standard Memories' booth 1041.

Highlighted will be the SM 440 core replacement for 360/44 CPUs that offers four times standard IBM capability.

The firm is at 2801 E. Oakland Park Blvd., Fort Lauderdale, Fla. 33306.

3M Displays Diskettes

CHICAGO – 3M Co., occupying booths 254, 256, 258 and 260, will display its line of magnetic media including its new 740 diskette formatted and verified for use with the IBM 3740 data entry system. 3M can be reached through P.O. Box 33600, St. Paul, Minn. 55133.

3M 740 Diskette

Data Disc Packs Disks

CHICAGO – The Data Disc, Inc. fixed-head magnetic disk memory and the company's multiterminal, IBM-computer graphic display system will be featured at booth 881.

The fixed heads operate at 10 in. from the disk. The firm is located at 686 W. Maude Ave., Sunnyvale, Calif. 94086.

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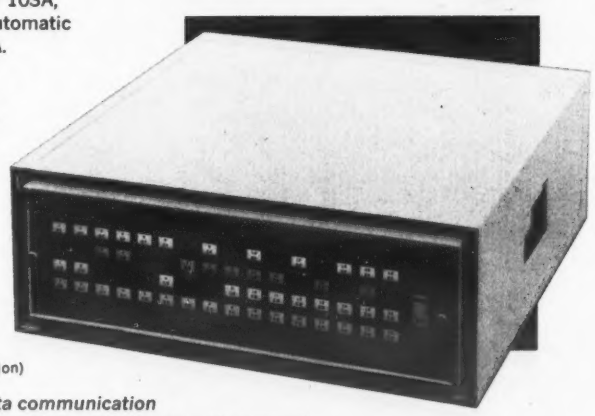

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NCC '74 Software/Services

IMSL Providing Data On Fortran Library

CHICAGO – International Mathematical & Statistical Libraries, Inc. (IMSL) plans to make Edition 4 of its Fortran subroutines library available in November, and will be providing details of the update at booth 243.

Plans call for new linear equation solvers to handle real matrices in band storage mode, and a numerical integration routine based on Carl de Boor's cautious adaptive Romberg routine. The company also expects to add a driver subroutine to provide an easier means of CALLing the existing linear programming subroutines ZX1LP and ZX2LP, a spokesman said. IMSL is at 6200 Hillcroft, Suite 510, Houston, Texas 77036.

IDMS Seminars Extend Cullinane's Exhibit

CHICAGO – Seminars dealing with the technical aspects of the Integrated Data Base Management System (IDMS) will be featured by Cullinane Corp. as an extension of its exhibit in booth 1036. IDMS is unique among data base management systems for IBM and Univac Series 70 equipment, according to Cullinane, in that it is designed to meet a subset of the Codasyl specifications

Cullinane, located at One Boston Place, Boston, Mass. 02108, will also be showing the generalized information retrieval system Culprit.

Compuserv to Connect Data Concentrators

CHICAGO – Compu-Serv Network, Inc. will be demonstrating the capability of Compu-Station/11 remote concentrators or remote batch terminals it is installing in place of hardware multiplexers at various branch offices. The units include DEC PDP-11/05s, line printers and card readers and are designed to be interfaced with the network's Decsystem-10s in Columbus, Ohio, the firm's headquarters.

The units will be in use at booth 353.

GE Shares Mark-III

CHICAGO – General Electric will feature its Mark III remote-computing information services in its exhibit at booth 475. Mark III provides conventional time-sharing, networking and remote batch computer services to users in 17 time zones.

The service is based on a "super center" of interconnected communications processors, mainframes and peripherals in Cleveland, Ohio, and can be accessed by local calls in more than 360 world cities.

DTSS Sites Accessible

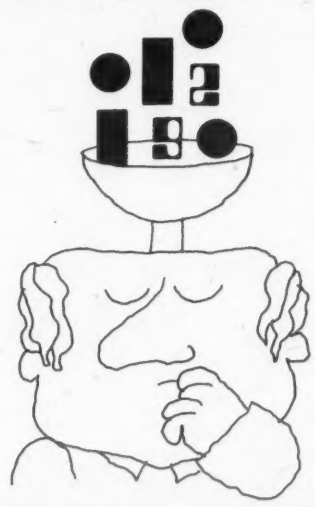
CHICAGO – Access to several installations already using the Dartmouth Time-Sharing System (DTSS) will be provided on a range of terminal equipment at the DTSS, Inc. exhibit in booth 873.

DTSS runs on Honeywell 600/6000 computers and is capable of supporting "250 or more users" in an easy-to-use English-oriented environment, while still providing batch processing capabilities. A large selection of application programs in Fortran, Basic, Cobol and APL are part of the system, a spokesman from the Hanover, N.H., firm noted.

BTI Enhancements Set

CHICAGO – Expansion of the 3000 Series of interactive computer systems to support 32 ports, string arithmetic and software enhancements in system control and security will highlight the Basic Timesharing, Inc. exhibit at booths 1023 and 1122.

The 3000 Series includes five models in a variety of configurations, the company said from 680 Almanor Ave., Sunnyvale, Calif. 94086.



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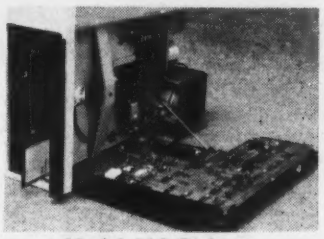
Innovex Presents Diskette Drives

CHICAGO – Innovex Corp. will exhibit its Model 210 Diskette disk drive for the first time at booths 348 and 350. The drive is compatible with the drive used in the IBM 3740 data entry system.

NCC '74 Storage

The IBM-compatible drive will be exhibited along with the Innovex Model 100 diskette systems which are fully interfaced disks available with utility software for many minicomputers, the firm said.

The 210 drive can be operated



Model 210 Diskette

in any orientation without modification.

The Model 210 compatible diskette drive has a capacity of 3.1M bits, track-to-track seek time of 10 msec and average latency of 83 msec. Prices start at $750 from the firm at 75 Wiggins Ave., Bedford, Mass. 01730.

STC 8000 Super Disk Takes Center Stage

CHICAGO – Storage Technology Corp., in booths 1168, 1170 and 1172, will be showing equipment from its 8000 Series Super Disk subsystem and its high density 3600/3800-IV 6,250 bit/in. magnetic tape subsystem.

On exhibit will be an 8800 disk module and an 8000 disk controller. The 8800 model has a capacity of 800M bytes and contains four disk stacks accessed by a central mechanism called the arc actuator.

The fixed-media Super Disk is best suited for high volume applications, the firm noted.

Also on display will be STC's 3335 100M-byte disk drive.

STC is at 2270 S. 88th St. Louisville, Colo. 80027.

Digi-Data Introduces Mini/Tape Interface

CHICAGO – Booth 169 here will be devoted to magnetic tape equipment from Digi-Data Corp., including the introduction of a magnetic tape interface for Hewlett-Packard 2100 minis.

The firm will also show its Model 1700 Maxidek, a synchronous magnetic tape transport that operates at 45 in./sec and features recording from 7-track 200 bit/in., up to 9-track 1,600 bit/in., IBM-compatible, according to the firm from 8580 Dorsey Run Road, Jessup, Md. 20794.

Dataram Memories Set

CHICAGO – Dataram Corp. will be showing its complete DR-101/102 family of memory systems including 8K and 16K modules, three different chassis and power supplies for minicomputers. Various options included are logic cards, tester and extender cards.

Also for the first time the firm will show its 16K by 18-bit DR1200 single card memory system for Data General's Nova 1200 series of minicomputers.

The firm is at Princeton-Hightstown Road, Cranbury, N.J. 08512 and will occupy booths 267 and 269.

Disks Cleaned On Site

CHICAGO – Cleaning and inspecting disk packs and disk cartridges will be going on at the Precision Methods, Inc. booth 1115. The firm offers on-site quarterly cleaning of disk packs at $24 apiece per year. The firm is at 8825 Telegraph Road, Lorton, Va. 22079.

Miniperipherals Show Their Stuff

CHICAGO – At booth 245, Applied Data Communications will demonstrate its miniperipheral product line consisting of a mini memory loading unit, a 3M magnetic tape cartridge peripheral system, an IBM-compatible floppy disk peripheral system and a reprogrammable read-only memory for the DEC PDP-11.

The firm's portable program loading system, 41-104, is a push-button loader and replaces the need for paper tape core loading, the firm said.

The firm is at 1509 E. McFadden Ave., Santa Ana, Calif.

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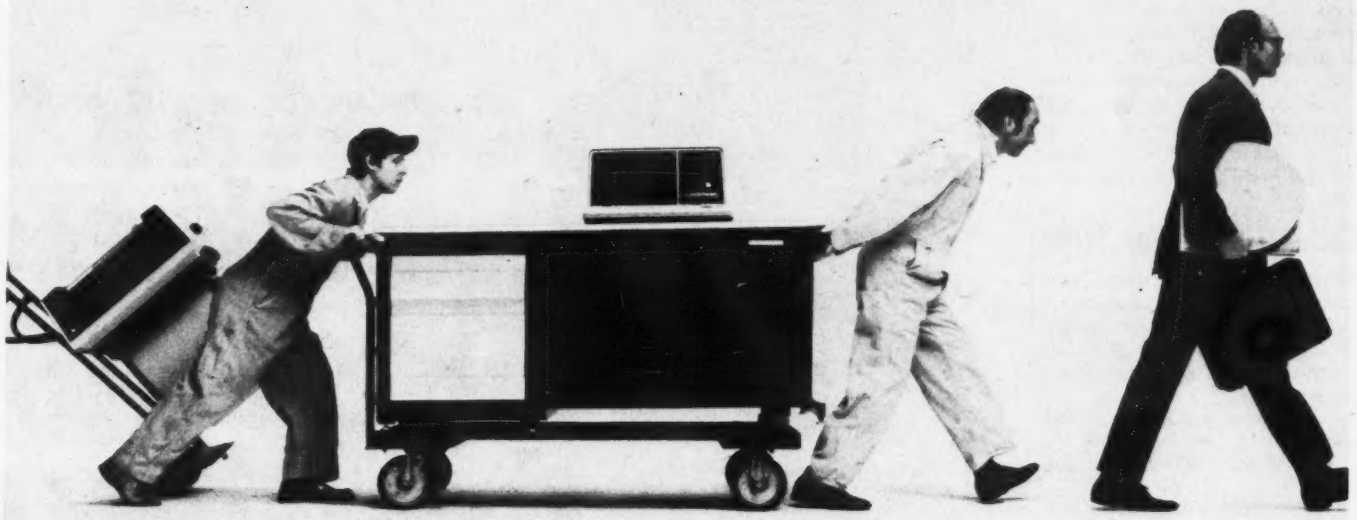

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You can use existing RPG II source level programs and tie in easily with new technology peripherals.

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Variety Earmarks Data Communications Displays

Teleprinter Line Tops Computer Devices Show

CHICAGO – Computer Devices will utilize booths 219 and 221 to show its Model 1030 line of portable time-sharing teleprinters. On display will be the recently announced line of

132-char. teleprinters and the 80-column automatic send and receive terminal with a built-in mini tape system. Included will be the 1030 line of terminals which have APL, Ascii, 2741 and Multics capabilities in various models.

The company, a Tech Ven corporate partner is at 9 Ray Ave., Burlington, Mass. 01803.

EPI Spotlights COM-300 Data Recording Device

CHICAGO – Electronic Processors, Inc. will demonstrate its data communications recorder that utilizes the 3M cartridge and a built-in microprocessor.

Called the EPI-com 300, the device can transmit transcribed data at speeds from 100- to 9,600 bit/sec. The unit, showing at booths 979, 981 and 983, is said to be compatible with "most data terminals and CRT displays."

The firm is at 1265 W. Dartmouth Ave., Englewood, Colo. 80110.

Codex Focuses on 900s

CHICAGO – Codex Corp. will feature its recently announced family of time division multiplexers. The 900 Series of multiplexers includes stored memory programs.

Also shown will be the 8300 group band modem and the 4,800 bit/sec 4800I data modem.

The company is at 15 Riverdale Ave., Newton, Mass. 02195. Two Codex CT-6 communications terminals will be operating at booth 301.

Bell DDS Takes Floor

CHICAGO – The Bell System exhibit at booth 545 will highlight AT&T's Dataphone Digital Service as well as Bell's family of LSI data sets which includes the Dataphone 4800, 2400, 1800 and 1200.

The Dataspeed 40, AT&T's display terminal will also be shown and Bell communications consultants will advise users on current Bell products and services.

ICC Puts Out Data Sets

CHICAGO – International Communications Corp. will show its Modem 20 LSI and Modem 24 LSI data sets at booth 517.

The units transmit data at 2,000- and 2,400 bit/sec and include error diagnosis capability in point-to-point and multipoint nets.

The firm is at 7620 N.W. 36th Ave., Miami, Fla. 33147.

Timeplex Takes TDMS

CHICAGO – Timeplex, Inc. will be at booths 358 and 360 to demonstrate its line of low-speed 103 and 202 Bell-equivalent data sets.

Also shown will be the T-96 time division multiplexer and a version of the C-32 data channel concentrator which allows up to 32 calling terminals to contend for up to 16 CPU ports.

Timplex is located in Norwood, N.J.

Megadata Has Mac-Net

CHICAGO – Megadata Computer and Communications Corp. will demonstrate its Mac-Net terminal and P1000 floppy disk system at booth 925.

Dual cassette units and a CRT display system will also be shown. The SIR-1000 intelligent programmable terminal used for inventory control, credit checking, text editing and message switching will be featured.

The firm is at 35 Orville Drive, Bohemia, N.Y. 11716.

MCS Primes Processor

CHICAGO – Modular Computer Systems, 1650 West McNab Road, Fort Lauderdale, Fla., 33309 will show its Modcomp IV/20 and Modcomp II communications processor at booth 331.

Also shown will be the Modcomp II/200 and II/220 real-time hardware packages and an operating network of the company's processors. Measurement control and communications applications will be stressed at the exhibit.

GDC Markets Modems

CHICAGO – General Data-Comm Industries, Inc. will show several data communications products at booth 1200s and 1202. Included will be the TDM 1251 bit interleaved time division multiplexer for synchronous communication nets; the GDC 201 series of LSI modems which operate at 2,000- and 2,400 bit/sec with local and remote diagnostics; and the GDC Series 1300 terminals.

The company is at 131 Danbury Road, Wilton, Conn. 06897.

TCP System Debuts

CHICAGO – Telefile Computer Products, Inc. will show its TCP-64-4 synchronous high-speed programmable store and forward message switching system at booth 128.

The system handles 16 lines at rates up to 50 kbit/sec and allows a concentration of data from several terminals into one or more high-speed lines. Telefile is at 17131 Daimler St., Irvine, Calif. 92705.

The new GTE Information Systems' IS/7800 Series Intelligent Video Terminals cost an average of 15-39% less than IBM 3270's on one-year rental, and 33-43% less on three- and five-year rentals. Buy them outright, and save 40-50%.

But we don't just cost less. We also offer more: Four character-capacity choices, not just two (240, 480, 960, 1920). Upper and lower case, and double-width characters. Extended character set with bar graphs, charts, histograms and line drawings. Inverted image (black on white). Underlining. Character blink. Impact or thermal printers at 30-165 cps. Of course, like the 3270, we offer complete addressability of any character on the screen, and an optional light pen.

And everything is truly plug-to-plug compatible with the IBM 3270, and interfaces with IBM 360/370 systems. No hardware or software changes. Even the cables are compatible.

Costs less. Does more. The IS/7800 terminal is microprogrammed to handle today's problems, and can be programmed to meet tomorrow's.

What we're saying is, we not only give you more

We cost a lot less than they do

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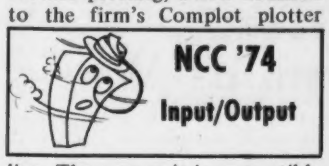
GTE Information Systems: One Stamford Forum, Stamford, Conn. 06904. **Atlanta,** 404-688-1670; **Boston,** 617-237-5222; **Chicago,** 312-332-7800; **Cleveland,** 216-771-8455; **Dallas,** 214-741-4361; **Detroit,** 313-353-5494; **Hartford,** 203-563-3767; **Houston,** 713-626-1713; **Los Angeles,** 213-380-2309; **Minneapolis,** 612-854-2898; **New York,** 212-486-3290; **Philadelphia,** 215-649-7410; **Pittsburgh,** 412-391-4170; **St. Louis,** 314-863-0330; **San Francisco,** 415-349-2600; **Seattle,** 206-283-3103; **Washington,** 202-293-2800, **Montreal,** 514-866-9324.

MTR-3 Plotter Has 1K Buffer

CHICAGO – Houston Instrument will show its MTR-3 magnetic tape reader/controller for off-line plotting, a new addition to the firm's Complot plotter line. The new unit is compatible with most Fortran IV systems, the firm stated, and includes vector format, 1K-char. buffer memory and straight line interpolation.

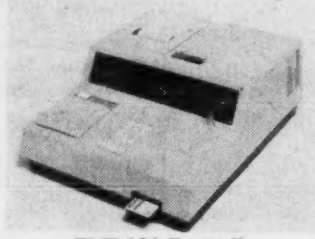


Houston Instrument is based at 8500 Cameron Road, Austin, Texas 78453, and will exhibit at booth 1011.

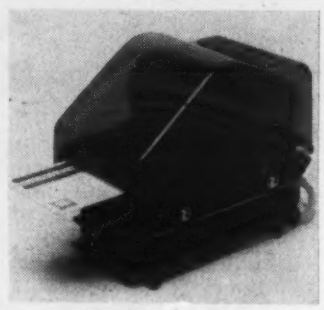
Houston Instrument MTR-3

Seiki Unit Reads Mag Credit Cards

CHICAGO – Sankyo Seiki (America), Inc. – which will be operating out of booths 948 and 950 – is planning to show several banking and credit card products.



EVT-101 Encorder



MCT-200 Card Reader

The firm will be introducing a new magnetic card reader and a compact magnetic encoder, as well as demonstrating other magnetic card readers.

The firm is at 13000 S. Athens Way, Los Angeles, Calif. 90061.

Ramtek Display Makes Its Debut

CHICAGO – Ramtek Corp. has slated for introduction a low-cost color graphic display system which, the company said, provides rectilinear graphics and alphanumerics in seven basic colors, full-screen addressing, blink mode and half intensity shades.

Ramtek, located at 292 Commercial St., Sunnyvale, Calif. 94086, will be in booth 101.

Optical Scanning Boasts OCR Unit

CHICAGO – Optical Scanning Corp. will introduce a low-cost optical character reader, the Op-Scan 37, which can be used as a remote or batch scanner.

The firm will also be showing its new Vistar programmable terminal, a CRT with microprocessing capability.

Optical Scanning, P.O. Box 40, Route 332, Newtown, Pa. 18940, will be at booth 921.

CDC Surrounds 370/155 With Own Peripherals

CHICAGO – Control Data Corp.'s exhibit in booth 735 will consist of an IBM 370/155 mainframe surrounded by CDC peripherals, including a monolithic memory, tape transports, single- and double-density multiple disk systems, a printer and terminal.

In addition, the Minneapolis-based firm will demonstrate various application packages on its Cybernet time-sharing service.

Di-An Teleprinter Set

CHICAGO – Di-An Controls, Inc. will be showing an impact teleprinter designed for time-sharing, communications and minicomputer applications. Booth 1003 will also feature an airline ticket printer and/or boarding pass printer, which is also suited to applications such as entertainment ticketing, off-track betting and labels, the firm said.

Di-An is at 944 Dorchester Ave., Boston, Mass. 02125.

Odec Parades Printer

CHICAGO – Odec Computer Systems, Inc. will show in booths 938 and 940 a 300 line/min printer as well as a 60 line/min printer with internal mini-processor which, the firm said, will not be released until late summer.

Odec is at 25 Graystone St., Warwick, R.I. 02886.

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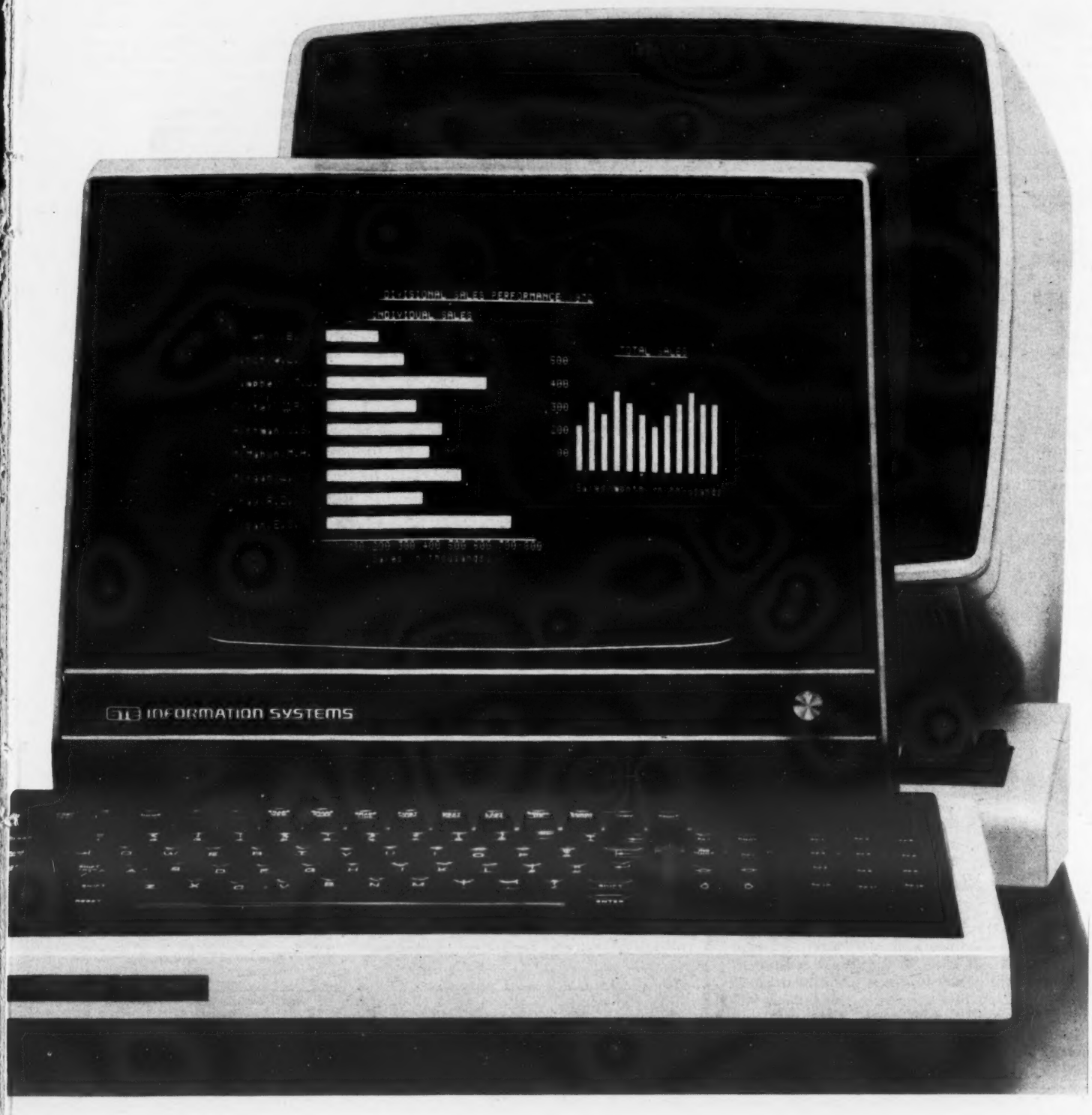

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Terminal Data Ready With Ascii Recorder

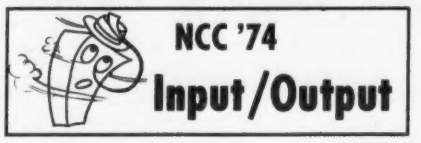
CHICAGO – Terminal Data Corp. will be introducing an Ascii cassette recorder which plugs into any teletypewriter with a standard RS 232 interface.

A line of previously announced terminal workstations, with built-in power for CRT terminals, keystations and microfilm readers, will be shown for the first time at booth 259.

Terminal Data is at 13447 New Hampshire Ave., Silver Spring, Md. 20904.

Microfilmer, COM Service Highlight Kodak Exhibit

CHICAGO – Eastman Kodak's Kom-80 microfilmer will be linked to the Hewlett-Packard magnetic tape reformatting system at booth 755. Also on display there will be the Kodak Miracode II retrieval terminal, the Recordak image control keyboard, Model IC-5, mounted



to the Recordak Starfile reader, Model PR-1, and an assortment of microfiche readers.

A new service will be highlighted – the Print Com Service – which is an interactive computer program designed to calculate the cost/efficiency difference between hard-copy computer output and COM-generated microfilm for specific applications, the firm said from 343 State St., Rochester, N.Y.

Keypunches Come Calling

CHICAGO – Data Rentals, Inc. will show a variety of 029-type keypunches.

The firm, based at 2919 S. La Cienega Blvd., Culver City, Calif. 90230, will be at booth 1228.

Cummins' World

Cummins-Allison Corp. will demonstrate its Keyscan 4400 data entry system at booth 370.

The firm will show optical and Micr scanners, as well as its key-disk system.

Cummins-Allison is at 800 Waukegan Road, Glenview, Ill. 60025.

Tally Booth a Mixed Bag Of Printers and Readers

CHICAGO – Tally Corp. will be exhibiting a variety of equipment including line printers, punched tape readers and perforators, and a key-to-tape terminal.

The firm will also exhibit in booths 322, 324, 326 and 328 for the first time the Model R2050 photoreader with speeds of 250 char./sec and a line of 125- to 250 line/min printers featuring a broad range of character fonts, including 96-char., upper and lower case.

Tally is located at 8301 South 180th St., Kent, Wash. 98031.

Comtal Displays Display

CHICAGO – Comtal Corp.'s exhibit in booth 132 will be directed at users in the medical/industrial, law enforcement, weather analysis and earth resources areas with practical demonstrations of the new Comtal 8000 series digital image display.

The equipment operates as a stand-alone system or as a peripheral device, according to the company located at 333 N. Santa Anita Ave., Arcadia, Calif. 91006.

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Roy Freed has specialized in computer-related legal matters for many years. He has served as inside counsel for a major manufacturer of digital computers, and is currently engaged in **private practice with a prominent Boston law firm.**

He has authored many articles on the various legal aspects of computers – including "Computer Frauds – A Management Trap" *(Business Horizons)* **and a book entitled "Computers and Law – A Reference Work." Mr. Freed will personally conduct the entire seminar.**

Should you attend this seminar?

If your're involved in the purchase of EDP equipment or services, the answer is a resounding "yes." Whether you're a corporate counsel, contract administrator, DP manager, consultant or officer of a using firm, this seminar will pay for itself many times over. You just have to read the pages of *Computerworld* to realize how frequent supplier problems are – and how costly and disruptive they can be. This seminar can help you get what you want when you want it. It will help your company, your industry and you!

Times, places and cost

There is still one more seminar scheduled this spring.

May 22-24–St. Francis San Francisco

Total cost for the entire seminar, including the complete resource notebook, continental breakfasts, lunches and coffee breaks, is $295.00. Hotel rooms, if required, are not included.

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Digi-Log Sends Portable Controller

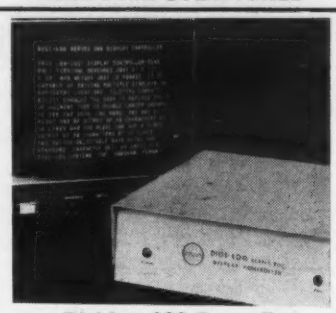
CHICAGO – Digi-Log Systems, Inc. plans to show its Series 300 display controller and Series 400 data line monitor.

The Series 300 is a portable Ascii display controller that can drive up to 10 displays in different locations, the firm said. It is TTY-compatible and is available in the Model 305, with 40 char. by 16 lines priced at $790, and the Model 306, 80 char. by 16 lines, for $875.

The units provide 7-bit parallel interface with a data rate capability of 1,200 char./sec asynchronously. Optional serial interfaces are available with multiple rates.

On display at booths 1224 and 1226, the Series 400 data line monitor uses either a video monitor or a TV set to display all line and data information between two EDP devices. Prices range from $1,420 to $1,995.

Digi-Log is on Babylon Road, Horsham, Pa. 19044.



Digi-Log 300 Controller

'Mini-Tec' Line Here

CHICAGO – Tec, Inc. will bring its Mini-Tec line of terminals, priced under $1,000, to booth 337. The firm is at 9800 N. Oracle Road, Tucson, Ariz. 85704.

Facit Addo Products Receive 1 Booth Each

CHICAGO – Facit-Addo, Inc. has taken three booths (1069, 1071 and 1073) in order to introduce three new products: the Facit 4203 tape cassette unit, the 4553 tape unit with RS 232C interface and power supply, and the 4501 numeric printer.

The firm is based at 501 Winsor Drive, Secaucus, N.J. 07094.

6050 Card Reader Signs in for MDS

CHICAGO – Mohawk Data Sciences, booth 551, will be introducing its 6050, a 300 card/min reader intended primarily for minicomputer and terminal applications. The input hopper holds 1,000 cards, so the attendant can load cards while operating in the normal reading mode. The output hopper holds 1,100 cards.

The 6050 is priced at $1,300 in OEM quantities.

The firm will also show its high-speed drum printer with bar-code font.

MDS can be reached through Box 362, Utica, N.Y. 13503.

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Nixdorf Demonstrates Software for 840s

CHICAGO – Nixdorf will be demonstrating specially developed software for the 840 series of minicomputers from booths 232, 234 and 236, along with a demonstration of the 820 system.

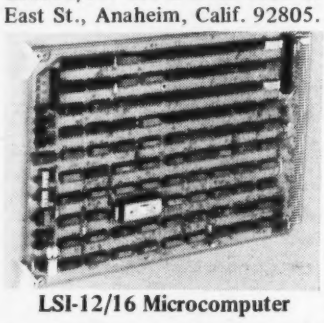
In particular, the firm indicated it would show a new Class program for certified public accountants as well as special systems for mortgage banking and insurance applications.

The firm is at 5725 E. River Road, Chicago, Ill. 60631.

GA Shows Wide Range Of Mini-Based Systems

CHICAGO – General Automation will show a wide range of mini-based products at booth 525.

The firm will show its Super Disk Monitor System, a mini-based RJE/Hasp work station, an SPC-16 mini in a new configuration, and the static LSI012/16. GA is from 1055 S. East St., Anaheim, Calif. 92805.



LSI-12/16 Microcomputer

Interdata 7/16 Tested

CHICAGO – An Interdata Model 7/16 mini will be undergoing tests on a vibrating table at booth 571.

In addition, the firm will show the Model 7/32 mini system and various subsystem modules such as a 32K-byte memory board, as well as run demonstrations of different software systems. The firm is from 2 Crescent Place, Oceanport, N.J. 07757.

HP Calculators in Town

CHICAGO – Hewlett-Packard, which will be located in booth 535, plans to show its 2100 system as well as a host of HP calculators including the 35, 45, 65 and 80, according to the firm from 11000 Wolfe Road, Cupertino, Calif.

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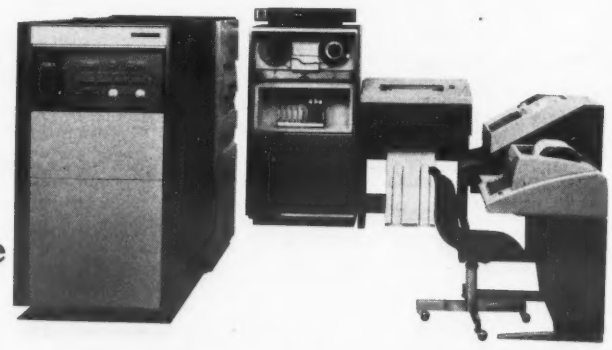

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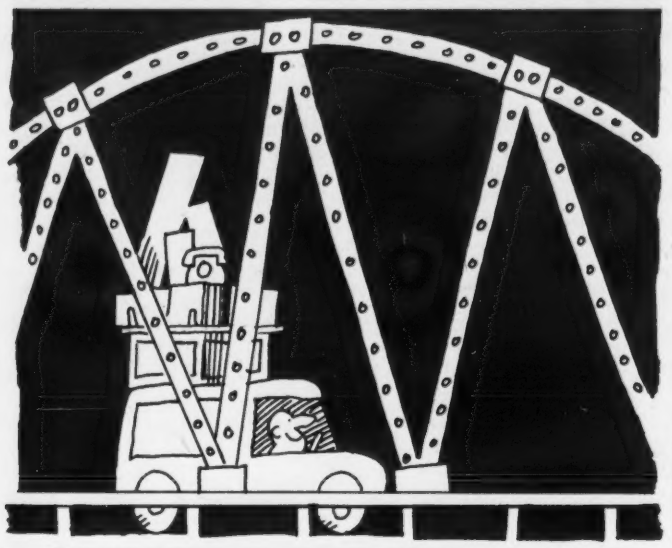

Our New York Office has just crossed a bridge.

Don Fagan and Frank Gallo, *Computerworld's* intrepid Eastern Regional salesmen, have pitched a new office. They can now be found overlooking the toll booths of the George Washington Bridge in Fort Lee, New Jersey – just 20 minutes from downtown Manhattan. Their new address is below and they'd be glad to hear from you any time.

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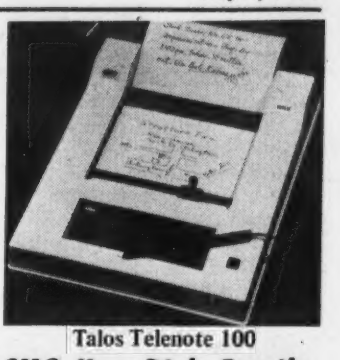
Talos Telenote 100 Tags Along

CHICAGO – The Telenote 100 will be featured by Talos Systems, Inc. in booth 237.

NCC '74 Input/Output

The unit can be attached to any telephone and used to transmit rough sketches, signatures or other handwritten data while a user is engaged in a telephone conversation. Duplication of the graphics and the voice messages are received by companion units at the other end.

The firm, which is at 7311 E. Evans Road, Scottsdale, Ariz. 85260, will also be showing its Cybergraphic tablet digitizer for data processing applications.

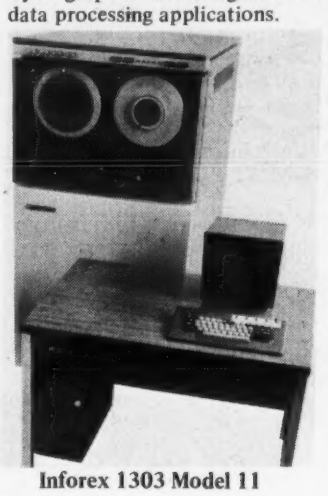


Talos Telenote 100

Inforex Brings Key Entry Units

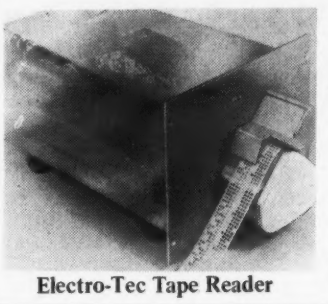
CHICAGO – Inforex, Inc.'s exhibit in booth 665 will feature two models of the 1303 intelligent key entry system, line and serial printers, and a binary synchronous communications capability which, the firm said, allows communications on-line to 360/370 mainframes and off-line to other compatible binary synchronous devices.

Inforex is located at 21 North Ave., Burlington, Mass. 01803.



Inforex 1303 Model 11

Electro-Tec Strip Printer Stars



Electro-Tec Tape Reader

CHICAGO – A new 120 char./sec non-impact strip printer which uses solid state components and has only one moving part will highlight Electro-Tec Corp.'s exhibit in booth 375.

Electro-Tec, based at 1600 N. Main St., Blacksburg, Va. 24060, will also display punched paper tape readers and spoolers with live demonstrations on various equipment.

CMC Key-Disk Family In Live Demonstration

CHICAGO – A demonstration of the Telebatch data communications sytem will highlight the Computer Machinery Corp. exhibit in booth 461. The system links a key-to-disk system over telephone lines to other key entry stations and a CPU.

CMC will also be showing its low-end CMC 5 Keyprocessing key-to-disk system and its top-of-the line CMC 18, as well as the CMC 36 Dataprint off-line print system. The newest member of the family, the CMC 16, will be described in a slide show.

CMC is located at 2500 Walnut Ave., Marina del Rey, Calif. 90291.

Omron Shows Wares

CHICAGO – In addition to showing its intelligent CRT terminal, Omron R&D, Inc. will be introducing the Model 2306 printer and Model 1020 dual cassette unit. Booth 821 will also feature demonstrations of text editing programs and order entry applications, the firm said from 432 Toyama Drive, Sunnyvale, Calif. 94086.

If Data Communications is part of your future, then this unique seminar should be on your schedule.

If you're now involved in Data Communications (or will be soon), we'll help you learn the ins and outs of the data communications field.

This is the seminar that wraps it all up for data communications users. It's called *Data Communications – The Executive Imperative*, and it covers both fundamentals and applications-oriented subjects ranging from transmission theory to terminal selection techniques. It gives you what you need to know to plan effective communications systems in two busy days. And that's saying quite a lot. Because data communications is a complicated area with many problems for the user. Proper planning is a must. And this seminar tells you how to go about it.

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- Basic terminology of the field.
- Tariffs and cost-savings.
- Effect of transmission problems on a network.
- The modem – how it works and what it does.
- Terminals and their performance.
- Multiplexing and data concentration.
- Line-control software.
- Network organization and design.
- How to upgrade to a bigger system.

Free reference materials and continuing updates

As a participant in the Data Communications Seminar, you'll receive a valuable set of reference materials prepared by the ICC Institute. These materials include a comprehensive 2-volume looseleaf outline of all course materials, a copy of "Data Modem Selection and Evaluation Guide" by Vess V. Vilips, a "Data Communications and Teleprocessing Dictionary" and a line-cost calculator.

And that's just the beginning. You'll also receive free update materials for afull year! This is more than just a seminar. It's a continuing reference service as well.

Seminar Leader is Dr. Dixon Doll, a highly respected teleprocessing consultant

Dr. Dixon Doll leads the expert faculty at this seminar. He has his Ph.D. in Systems Engineering from the University of Michigan and many years of experience in this field as a consultant and educator. He has performed work-study with communications techniques at M.I.T., taught graduate-level computer systems design, and has served as professional consultant to such firms as IBM, Raytheon, ICC and MCI. Dr. Doll is in charge of our faculty of experts, and takes an active part in the entire seminar.

You should attend this seminar, if . . .

- You are currently involved in data communications on a management or operational level and wish to expand your knowledge of the field.
- Your company will be going into this field in the near future.

Charges and Enrollment

The total cost for this two-day seminar is $350, including workbook, reference materials, year-long update service, luncheons and continental breakfasts. This cost does not include hotel rooms, if necessary.

To enroll, look over the schedule below, fill out the coupon and send it in. Remember, enrollment must be limited, so don't wait until it's too late!

Data Communications, The Executive Imperative

Course materials and outline prepared by the ICC Institute.

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☐ San Diego	Sept. 30–Oct. 1	Town & Country
☐ Washington, D.C.	October 7-8	Loewe's L'Enfant Plaza
☐ New York	October 14-15	St. Moritz
☐ Chicago	November 4-5	Water Tower Hyatt House
☐ Miami	December 2-3	Miami Marriott (N.W. 42nd St.)

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Remex Rounds Up Rash of Peripherals

CHICAGO – As a multiperipheral company, Remex's booth 325 will contain equipment such as punched tape units, cassette punched tape emulators, digital cassettes and floppy disks – from the mechanism through system level as well as interface assemblies for various minicomputers.

NCC '74 Storage

The newest product to be introduced will be a floppy disk system featuring an IBM-compatible formatter with internal or external interface. The interface is generalized for all minicomputers and may be readily adapted for a variety of specific computer architectures, the firm said. The initial system to be shown will be in operation with a PDP-11 minicomputer.

The firm is at 1733 Alton St., Santa Ana, Calif. 92705.

Cassettes, Floppy Disks Complete Dicom Display

CHICAGO – Dicom Industries will have its cassette and floppy disk equipment for minicomputers and data terminals at booths 1220 and 1222.

The cassette equipment is Ansi/Ecma-compatible and the systems are complete with operating software.

The firm will also demonstrate a floppy disk system for Hewlett-Packard computers with a transfer rate of 15 kword/sec. The firm is at 715 N. Pastoria Ave., Sunnyvale, Calif. 94086.

Kennedy Shows Tape Drives

CHICAGO – Kennedy Co. will show its line of synchronous and cartridge tape transports for minicomputers which incorporate maintenance panels to allow off-line testing.

In addition, the firm will demonstrate its 4000 cartridge tape drive using the 3M cartridge that provides a fully Ansi formatted system.

The firm, at 540 W. Woodbury Road, Altadena, Calif., will be in booths 839 and 841.

Dynastor Brings Floppies

CHICAGO – Highlighting Dynastor booth 967 will be the firm's models 30 and 40 floppy disk drives.

The Model 30 drive uses a single floating head with a floppy disk medium that holds 2.2M bits of data.

The Model 40 drive consists of two drives – one fixed and one removable – with a total storage of 4.4M bits, data transfer rate of 2.54M bit/sec and average access time of 210 msec.

The firm is at 5867 N. Broadway, Denver, Colo. 80216.

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*Partial List of Current Options

HARDWARE

Disk –
- 3330 – for the Model 30 – now under development
- 3330 – for S/360/50, 65, 67, 75
- 3330 – for all System 370
- 2319 – Double Density High Speed Systems for all System 360's
- 2319 – Single Density High Speed Systems for all System 360's
- 2314 – for all System 360's

Tapes –
- 3420 – High Speed Drives for all System 360's, 370's
- 2401 – Models for all System 360's

Memory –
- Model 30 – 64K to 512K
- Model 40 – 128K to 512K
- Model 50 – 256K to 2000K
- Model 65, 67, 75 – 256K to 4000K

Communications
- 3705, 3704 Plug for Plugs for System 360
- R.J.E. – Hardware and Software for System 360

SOFTWARE

DOS Support Processors
360's to support 360's
360's to support 370's
Add computer power and back up support to DOS Systems at low cost

Turn Key Package conversions
Model 20 to DOS Model 30's
System 3 to DOS Model 30's

Systems Conversions
Single Partition DOS to Multi-Partition DOS
DOS to EDOS

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Executor – High Speed Accelerator of OS Systems

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During the past 12 months MINICOMM has been installed at more than forty installations in the United States, Canada and Europe. In many cases it has replaced existing TP Monitors and access methods such as CICS, FASTER LC, DUCS, LOTUS and BTAM.

If you are currently running Telecommunications in a DOS or DOS/VS environment, or contemplating doing so in the future, why not talk to us about how MINICOMM can economically and efficiently meet your needs. Find out why our users call MINICOMM the "Communications Monitor with Charisma". Call Paul Berens at 212-489-7200 or mail the coupon today.

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PROGRAMMING METHODS A DIVISION OF GTE INFORMATION SYSTEMS

Data Products Picks Printers, Memories

CHICAGO – A 600 line/min printer and several memory products will be unveiled by Data Products Corp. in booth 309.

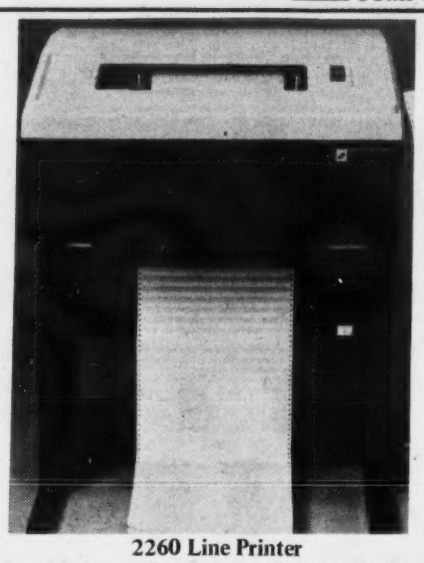
The Model 2260, a 136-column printer, is priced under $8,700 with quantity discounts available. The unit prints at 600 line/min with 64-char. set or 480 line/min with 96-char. set.

NCC '74 OEM Products

The Store/1618 is a 16K-word by 18-bit planar core memory system featuring 700 nsec cycle time and 275 nsec access time that sells for less than $2,000 in OEM quantities.

Up to eight 16K modules can be daisy-chained to form a system with a capacity up to 128K by 18, the firm said.

Core arrays and all electronics are housed in a module that measures 12 in. by 14 in. and consists of two circuit boards.



2260 Line Printer

Other products on display will include the Spad and Store/38 core memory systems.

Data Products is at 6219 De Soto Ave., Woodland Hills, Calif. 91364.

Shugart Storage Unit Holds Eight Drives

CHICAGO – Floppy disk maker Shugart Associates in booths 1024 and 1026 will feature the SA3900 storage facility and the SA3905 diskette initializer.

The SA3900, which can include up to eight SA900 diskette storage drives, is designed for attachment to key entry systems, source data recording systems, word processors, minis and small business systems.

In quantities of 100, the SA3900 system, including two SA900 drives and a SA910 control unit, is $2,500.

In addition, Shugart will show its SA902 dual diskette drive, which features independent data accessing, storage capacity of 6.2M bits, a transfer rate of 250 kbit/sec and an asynchronous average access time of 250 msec per spindle.

SA 3900 Storage Facility

Unit prices start at $1,275 from the company at 335 Soquel Way, Sunnyvale, Calif. 94086.

Norwegian Firm Sails With CRT

CHICAGO – The Norwegian firm of Tandbergs Radiofabrikk A/S plans to show its TDV 200 video display unit, the TD 1000 digital tape drive and a formatter in booths 964 and 966.

The CRT features a 15-in. screen, is TTY-compatible and handles transmission speeds from 110- to 9,600 bit/sec.

Edit functions include cursor positioning, erase and programmable two-level intensity and blink.

The TD 1000 tape drive offers IBM-compatible formats, with 7- and 9-channel 200- to 1,600 bit/in. densities. Tape speeds range from 25- to 90 in./sec and search speeds to 150 in./sec.

The TDF 100 formatter consists of a tape control module with optional buffer, an NRZI module and a PE module. The unit can be daisy-chained to up to eight drives, which can have different speeds, transfer rates and formats, the firm said.

Tandbergs may be reached through P.O. Box 9, Korsvoll, Oslo 8, Norway.

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The Mexican computer market is small by U.S. standards. But don't continue to overlook it. It is booming. A nice, orderly boom for computers, peripherals, software, supplies. Matching an annual growth of the economy of 6% for the last six years. That's second only to Japan.

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Two-Headed Card Reader Stars at Documation Booth

CHICAGO – A two-headed card reader that can read three separate card modes will be the star attraction at Documation Inc.'s booths 867 and 869.

One head, called the T series, reads conventional punched data while the other reads in either of two optical mark modes: with or without clock/registration marks.

The readers are available in speeds of 150-, 285-, 300-, 600-, 1,000- and 1,200 card/min from the company, whose mailing address is P.O. Box 1240, Melbourne, Fla. 32901.

Interdyne Shows Drives

CHICAGO – The IC-2400 digital cassette drive will share Interdyne Co.'s booth 1124 with the IC-2500 cassette drive.

The IC-2400, which is priced at $390 in lots of 100, uses a single servo-controlled direct drive capstan for tape velocity control and individual reel motors for tape tension control. The unit is available in read/write or read-after-write configurations from the company at 14761 Califa St., Van Nuys, Calif. 91401.

Miratel Exhibit 'Colorful'

CHICAGO – A programmable color display monitor will be highlighted by the Miratel Division of Ball Brothers Research Corp. in booth 201.

The BH Series monitors are capable of handling two video channels that are switchable from the front of the unit and allow external alphanumeric or light pen signals to be superimposed on the existing video picture.

The firm is from 1633 Terrace Drive, St. Paul, Minn. 55113.

Custom Displays Featured

CHICAGO – Automation Displays, Inc., at booth 334A, will show its Auto-Plexor multiplexer and custom displays.

The Auto-Plexor is a 16-bit-oriented lamp controlling multiplexer with a 9-bit address field. The firm is at 3833 N. White Ave., Eau Claire, Wis. 54701.

Terminals on Tap for Conrac

CHICAGO – Conrac Corp.'s booth 248 will feature the Model 401-3 adaptive data display terminal and the Model 480 TTY Plus data display terminal.

The 401 is a stand-alone unit with a 12-in. display, integral controller for TTY printer and serial or parallel operation.

Modular construction enables it to serve as a simple buffered display and as a microprogrammed adaptive display, or as an intelligent terminal with a microprocessor option, the firm said.

The TTY Plus operates at from 110- to 9,600 bit/sec, has an optional line insert/delete feature, can operate in block transmit mode and has protected forms area for form fill-out modes.

Conrac is at 600 N. Rimsdale Ave., Covina, Calif. 91740.

Conrac 401-3

Okidata Introduces Four Peripherals

CHICAGO – Four new products highlight the raft of peripherals at Okidata Corp.'s booths 250 and 252: a 500 line/min printer, a 110 char./sec printer, "double density" disk drives and plasma display panels.

In addition, an optical mark card reader and M-200D disk memory series will be shown.

The Okidata 4800 line printer is designed for heavy-duty applications and prints at speeds up to 526 line/min with a 64-char. set and 330 line/min with a 128-char. set over a 136 column line.

The unit uses the moving belt technique and is available from the firm at 111 Gaither Drive, Moorestown, N.J. 08057.

30-, 45 Char./Sec Printers Highlighted by Qume Corp.

CHICAGO – Qume Corp. plans to unveil its Q30 and Q45 printers at a demonstration in booths 224 and 226.

The Q45 prints up to 12 copies at 45 char./sec with typewriter print quality, while the Q30 averages 30 char./sec, the firm said.

The Q45 can accept unbuffered input from 300 bit/sec transmission.

In quantities of 100, the Q30 is priced at $1,425, the Q45 at $1,600, from 26203 Production Ave., Hayward, Calif. 94545.

Diablo Fixed Disk Drive Utilizes IBM 14-In. Media

CHICAGO – Diablo Systems, Inc.'s Model 21 fixed-media disk drive will be featured in booth 209.

The drive provides 24M bits of storage, using IBM's 14-in. disk media or approved equivalent. Average head positioning time is less than 70 msec, Diablo said.

Single unit price is $2,100 from 24500 Industrial Blvd., Hayward, Calif. 94545.

Diablo Model 21

FP Processors on Parade

CHICAGO – Floating Point Systems, Inc. is displaying its FP-07 and FP-09 two-card floating point hardware processors at booth 320. The units fit inside Data General's Nova or the DCC D-116 minis.

The FP-09 is a 64-bit package with stack-oriented command set and Fortran IV-compatible software. FP-07 is Fortran V compatible.

The company is at 3160 S.W. 87th Ave., Portland, Ore. 97225.

The Computer Caravan welcomes: DATA GENERAL CORPORATION

as an exhibitor in The Spring 1974 Caravan.

Data General Corporation will feature a Dual Processor/Shared Disc system under the control of the Real Time Disc Operating System. This is ideal for the high system availability and/or load sharing requirements commonly encountered in instrumentation, process monitoring and control, and communication applications.

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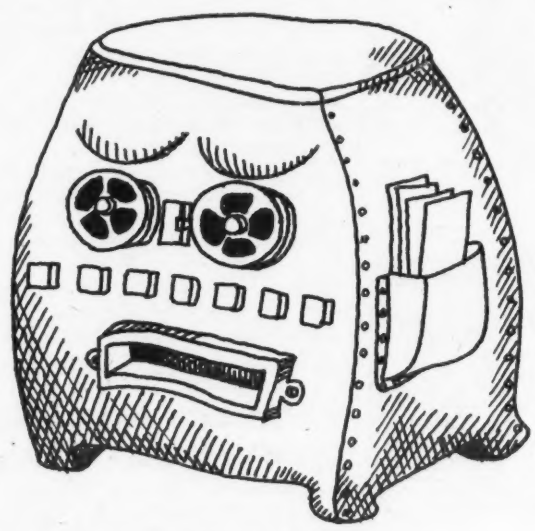
would you let an employee loaf on the job?

what about your computer?



It's not always easy to see when your computer isn't pulling its weight. But now you can. Through our new **Computer Utilization Program.**

We designed this program to help you get the most out of your computer hardware and software investments. It will report on computer utilization in terms of memory, CPU, terminals and peripheral devices; job classes, priorities and initiators too. The result can help you identify bottlenecks in your processing... pinpoint high and low utilization periods... and help you decide when to change hardware or software to improve service.

Cost for the Computer Utilization Program is just $3000. And it can pay for itself in savings, many times over, in short order. To learn more about the Computer Utilization Program send us the coupon. Or, better yet, to learn what it can mean to you, take advantage of the free offer described above.

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1. Send us a recent SMF tape, covering at least a week of operations...(send via UPS or insured air parcel post.)

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How much can our Computer Utilization Program help you? Neither of us can know until you send us your SMF tape. Send to Lou Pfeiffer/A.O. Smith Corporation/Data Systems Division/8651 N. Port Washington Rd., Milwaukee, Wisconsin 53217.

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A.O. Smith Data Systems
8651 N. Port Washington Rd.,
Milwaukee, Wisconsin 53217

Please send me additional information on the Computer Utilization Program and its reports.

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Title_____

Company_____

Address_____

City_____ State_____ Zip_____

A.O. Smith
DATA SYSTEMS DIVISION

The Computer Caravan welcomes: CENTRONICS
data computer corp.

as an exhibitor in The Spring 1974 Caravan.

Printers and Keyboard Printer: Centronics will be demonstrating their new Model 308 Incremental Keyboard Printer in an interactive mode. The Model 308 prints 120 cps/80 characters per line, serial transmission rate is 100- 9600 baud (optional), parallel transmission is up to 75,000 cps. Centronics will also be demonstrating the New Model 122. The high speed Model 122 prints 200 lpm (600cps)/132 characters per line. All Cnetronics impact printers will produce an original with up to four clear copies. All printers are plug-to-plug and software compatible. Many popular computer and communications interfaces are available.

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NCC '74
Miscellaneous

Modems, Phone Terminal Part of Northern Offering

CHICAGO – Digital data sets and a transaction telephone terminal will be shown by Northern Telecom at booth 1052. The data sets include compatibility with all-digital data networks and the terminal has a 16-key pad and display allowing for off-line data entry.

Northern Telecom is at 140 Federal St., Boston, Mass. 02110.

Telenet Plans to Reveal All About Its Packet Network

CHICAGO – Telenet Communications Corp. will describe its planned packet-switched data communications network at booth 1050.

The firm proposes to use high-capacity terrestrial and satellite communications channels leased from existing carriers in combination with its own switching centers.

The company is at 1666 K St. N.W., Suite 500, Washington, D.C. 20006.

On-Line 'Data Trap' Checks Interfaces to 9,600 Bit/Sec

CHICAGO – Car-Mel Electronics, Inc., 2218 Cotner Ave., Los Angeles, Calif. 90064, will show its M-501 on-line "data trap" which can check system interfaces operating at speeds up to 9,600 bit/sec.

The unit contains a display which can show the last 512 characters received or transmitted on a standard EIA interface. The device is said to be transparent to both CPU and communications equipment. Car-Mel can be found in booth 336A.

Microdata Offers 'Real' Look At Its Total System

CHICAGO – Attendees visiting booth 751 will be able to get hands-on experience with Microdata's Reality computer system and the English language that accesses the data bases within Reality. There will be from six to nine video display terminals available for users, the company noted from 17481 Red Hill Ave., Irvine, Calif. 92705.

Microdata will also be exhibiting its 1600 and 3200 Series computers, as well as Series 6000 and 6800 tape drives, and Series 9000 double-density disk drives, being shown for the first time. The 3200 Series systems have 32-bit microinstruction word length, 16-bit data path, MOS main memory and in one case – the 32/S – a high-level language called MPL, patterned after PL/I.

Performance Measurement Updates Tesdata Model 1185

CHICAGO – Tesdata Systems Corp., operating from booth 240, will introduce the System 1000 Model 1186-D performance measurement system, an update to the Model 1185.

In addition to measurement capabilities, the new unit provides a disk and a disk operating system which allow the users to generate their own utility programs for the measurement process.

The firm, which is based at 7900 Westpark Drive, McLean, Va. 22101, will also be showing the Model 1020-D Micro-Sum hardware monitor with a 9-track tape drive that permits a real-time display of hardware utilization along with recording data for later analysis with the firm's Sumdap software analyzer.

Unit Tests Circuit Boards

CHICAGO – Booths 1154 and 1156 will feature the Mirco 410 logic circuit test system, which is a software system for testing digital circuit boards at a 1 MHz-byte rate, according to Mirco Systems from 2106 W. Peoria Ave., Phoenix, Ariz. 85029.

The unit features a dynamic resolution of 100 nsec, a CRT terminal and a tape cassette unit, as well as test generation software, the firm said.

Mirco Test System

Teletype Packages Model 40

CHICAGO – Teletype Corp., the Skokie, Ill.-based firm, plans to demonstrate its Model 40 terminal system for data entry and inquiry response applications at booth 807.

Fire Safety Top Concern

CHICAGO – A demonstration of the fire retardant Halon 1301 will be presented by E. I. Du Pont de Nemours of Wilmington, Del., in booths 366 and 368.

The Ansul Co., from one Stanton St., Marinette, Wis. 54143, will also be showing in booths 968 and 970 its fire protection system developed to take advantage of Halon.

Lease Plans to Be Explained

CHICAGO – Electro Rent Corp. will explain its short-term lease plans for the rental of electronic test equipment, computers and computer peripherals from booth 927. The firm is at 2230 Charleston Road, Mountain View, Calif. 94043.

Card Embosser Encoder Set

CHICAGO – Data Card Corp. will show a new high-speed embosser encoder for plastic credit cards, according to the firm which will be located in booths 253 and 255.

The firm will also show magnetic tape input unit with capabilities for encoding magnetic stripes on credit cards. Data Card is at 7625 Parklawn Ave., Minneapolis, Minn. 55435.

Power Monitors Displayed

CHICAGO – A line of solid state power line disturbance monitors will be on display in booth 138 by Programmed Power, Inc., 141 Jefferson Drive, Menlo Park, Calif. 94025.

UPS Supplies Not Lacking

CHICAGO – Users interested in uninterruptible power supplies should look into booth 829 where the Exide Power Systems Division of EXB, Inc. will show models of the Superguardian power systems. The firm is at Rising Sun and Adams Ave., Philadelphia, Pa. 19120.

Sycor Shows Disk Option

CHICAGO – A dual, flexible disk option for the Model 340 intelligent terminal will be demonstrated by Sycor, Inc. in booth 611.

The double floppy disk option allows users to keep up to 450K bytes of information in local storage at the terminal, the firm said.

The firm will also demonstrate the 340 intelligent terminal itself and the Sycor 250 intelligent display.

Sycor is at 100 Phoenix Drive, Ann Arbor, Mich. 48104.

Here's a Cooler Idea!

CHICAGO – Air conditioning and humidifying equipment will be on display in booths 218, 220 and 222, according to AC Manufacturing Co. of Old Cuthbert and Deer Roads, Cherry Hill, N.J. 08034.

NCC '74

Miscellaneous

Lear Siegler Terminals Have Buffered Display

CHICAGO – Lear Siegler, Inc. will show two CRT terminals in booth 117.

The ADM01 has a fully buffered display and the new ADM-2 CRT features upper and lower case, up to 16 function keys, up to four pages of memory, and free format to buffer data for a printer. The firm is at 714 N. Brookhurst St., Santa Monica, Calif.

Datapro to Give Data On Its DP Services

CHICAGO – Datapro Research Corp. will show – in booths 923 and 1022 – its EDP information services including Datapro 70 and the Datapro report on minicomputers, the firm said from headquarters at 1805 Underwood Blvd., Delran, N.J. 08075.

In addition, new services including the Datapro reports on point-of-sale and banking will be on display.

Spatial Data Systems Has Image Digitizer

CHICAGO – The Computer Eye 108 image digitizer will be demonstrated for the first time by Spatial Data Systems, Inc. from booth 1104.

The system is a gray scale image digitizer that uses television techniques to digitize any scene into 512- by 480- by 8 bits and can be interfaced with most minicomputers and with 7- or 9-track tape, according to the firm.

The unit will be shown operating with a DEC PDP-11 at the show. Spatial Data can be reached through P.O. Box 249, Goleta, Calif. 93017.

Quantum Readies Sets Of Research Reports

CHICAGO – Research reports on various DP areas, including new reports on network information services and dedicated remote systems, will be featured in booths 1070 and 1072 by Quantum Science Corp. from 851 Welch Road, Palo Alto, Calif. 94304.

Furniture Line Complete

CHICAGO – Ingersoll Products Division of Borg Warner is planning a major display of computer supports and peripheral furniture for booths 131 and 133.

The furniture, which features electronics pedestal attachments, will mainly consist of improvements to the firm's present product line, the firm said from 1000 W. 120th St., Chicago, Ill. 60643.

Antistatic Units Set

CHICAGO – Several "improved" models of the firm's antistatic equipment including several shockless models will be on display in booth 217 by the Chapman Division of The Portland Co. from 58 Fore St., Portland, Me. 04112.

Keeping the Peace

CHICAGO – If the noise in your DP shop has gotten you down, the answer may be in booth 1025 where Van San Corp. will be showing a line of acoustical enclosures for office machines. The firm is from 1180 Centre Drive, City of Industry, Calif. 91789.

Paper Supplies Galore!

CHICAGO – Paper supplies, including thermal paper for terminals, mulitcopy terminal rolls and folded perforator tape, will be exhibited by Eastern Specialties, Inc., P.O. Box 350, Holyoke, Mass. 01040 in booth 871.

A Word From Commerce

CHICAGO – The important role computer manufacturers play in helping the U.S. to a favorable balance of trade will be emphasized by the Department of Commerce in booths 247 and 249. The exhibit will include the latest market research reports for computer equipment.

'I Wonder Who's Minding the Store?'

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Data loss is insideous . . . the ordinary day-to-day use of disc cartridges actually leads to steady deterioration. Even carefully controlled environments produce harmful contaminating effects. However, it is now possible to protect both System 3 (5440) and type 2315 disc cartridges, and the data they contain with the new Texwipe System 315, off-line motorized cartridge cleaner. The average cost to clean a cartridge is 15¢. The System 315 sells for only $950. For information on S/315, and the complete line of Texwipe disc pack cleaning and inspection instruments, write today.

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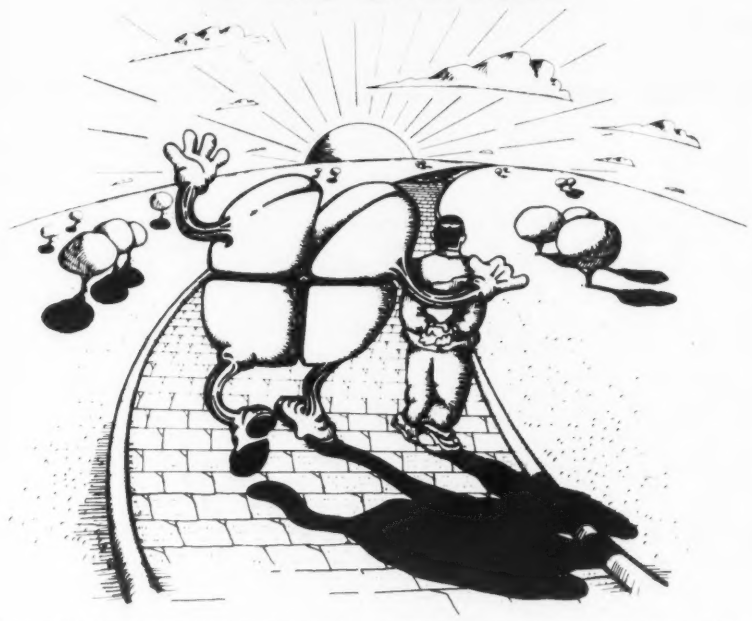

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Education Topics Range From CAI To Professional Career Growth

CHICAGO – Ten sessions will be devoted to the subject of education. Half the sessions will deal with the question of education about computers and half with the use of computer technology and methods for education.

The program, supervised by Erik D. McWilliams, will deal with present problems and capabilities and address future problems and opportunities.

A session on Technological Aids for the Physically Disadvantaged will lead off the program Monday afternoon. The papers in the session include "An Alternate Interface to Computers for the Physically Handicapped: The Automonitoring Communication Board," "A Computing Environment for the Blind," "A Computer-Based System of Speech Training Aids for the Deaf – A Progress Report" and "Computer-Assisted Instruction in Mathematics and Language Arts for Deaf Students."

NCC '74 Sessions

Recent Developments and Applications of CAI will be explored in four papers Monday afternoon. They are "Computer-Assisted Instruction in Chicago Public Schools," "A Status Report with Ticcet Project," "What Classroom Role Should the Plato Computer System Play?" and "CAI Comes of Age in a Public School System."

Tuesday morning's sessions on education begin with a look at the Use of Computers for Instruction and Administration in Elementary and Secondary Education. Scheduled papers include "Use of Small Computers," "A Time-Shared Service for Instruction," "Sharing of Computer Facilities for Administration and Instruction," "Training of Teachers in Computer Usage" and "Economics of Using Computers in Instruction."

"Why Industry Won't Hire Your Graduates," "How the Data Processing Industry Has Failed Education," "A Springboard for Data Processing Education in Oklahoma" and "Career Education in Business Data Processing Teacher Education" are the titles of four papers slated for presentation at a session labeled Business Data Processing Education – A Decade of Failure.

The status – and some recent developments – of University Computer Science Education will be discussed by a panel Tuesday afternoon.

An examination of the training of computer science and data processing professionals from the perspective of a system in a dynamic environment, along with recommendations for change, is also scheduled for Tuesday afternoon. The papers will include "Implications of Changes in the Secondary School Mathematics Curriculum for the Computer Science and Computer Engineering Curricula," "A Cognitive Model for Structuring an Introductory Programming Curriculum," "On the Preparation of Computer Science Professionals in Academic Institutions," "EDP Education – An Acute Crisis" and "An Undergraduate/Graduate Program in Information Systems."

The Computer as a Career Guidance Tool of the Present and Future will be examined in five papers Thursday afternoon including "The Potential Role of the Computer in Intuition and Self Development," "System for Interactive Guidance Information (SIGI): An Operational Example," "Computerized Vocational Information System (CVIS): An Operational Example," "Use of Computers in Relation to Critical Guidance Factors" and "Computer-Based Career Guidance Systems of the Future."

Continuing Education and Career Development for Computer Professionals will be the focus of another Thursday afternoon session with papers entitled "Career Development Review System – A New Approach to Performance Appraisal," "Step-by-Step: A Career Structure for Systematic EDP Growth," "A Systems Approach to Career Development: Report of Two Surveys," "EDP Certification . . . Is It Necessary?" and "Skills Possessed and Skills Useful for MIS Practitioners – A Research Report."

Friday morning, four papers will be delivered in a session entitled Continuing Education and Training Through the Use of CAI. Their titles are "Business and Industry in the 70s Find Computer-Aided Instruction a Practical Answer to Training Problems," "The Role of Computer-Assisted Instruction (CAI) in Management Information Systems," "Using CAI at Montgomery Ward" and "Using CAI at McDonnel-Douglas Corp."

Computer Education for Managers is the final subject which will be examined by the education program. "Computer Education for Administrative Managers," "Educating the Non-Data Processing Executive – Fact and Fancy" and "A Businessman's Approach to the Determination of the Value of Executive Level EDP Courses" are the papers scheduled for presentation at the Friday morning session.

Manufacturers Focus on Control

CHICAGO – The role of the computer as an aid in solving complex manufacturing control problems will be examined in nine sessions under the direction of Thomas J. Archibold.

Monday afternoon, IBM will present C-Comp – Communications-Oriented Manufacturing Plan: "A Paperless Factory Approach."

A session dealing with the use of on-line terminal information processing in manufacturing control systems will start off the Tuesday program.

Equipment Monitoring and Information Use will be investigated in two papers Tuesday morning. The papers are "Equipment Monitoring and Information Use" and "Computer Control of Component Insertion."

Tuesday afternoon, a panel will discuss the Problems, Perils and Promises of Computer Graphics. The panelists represent industrial users, system developers and university researchers.

"Numeric Control Machine Tool Technology and Applications" and "Part Family Code?" are two papers scheduled to be presented during a Wednesday morning session.

Another session Wednesday morning will cover the subject of Manufacturing Information Systems, providing some direction for "do differentlys."

Manufacturing Control Systems will be covered from two angles on Wednesday afternoon – first, the techniques employed in the development of computerized administrative systems for manufacturing control and second, the examination of some interactive graphic systems.

Presented papers will include "A Simple Distributed Systems Approach to Manufacturing Information Systems," "Bill of Material and Requirements Calculation Systems," "Interactive Computer Graphics Application of the Bi-Cubic Parameter Surface to Engineering Design Problems," "APLG – An APL-Based System for Interactive Computer Graphics" and "Twinkle Box – A Three-Dimensional Computer Input Device."

Wednesday afternoon there will also be a session of Shop Floor Control.

"Installing an On-Line Information System in the Manufacturing Environment" is the title of a Thursday paper.

Data Resources Allocation Theme Unites Managers

CHICAGO – The need for better control over corporate data resources has led to the inclusion of nine sessions on information management systems.

The sessions will highlight topics dealing with security and the humanizing of information systems, as well as a discussion of accessing networks through minicomputer systems, according to session organizer Herbert Seidensticker of Combustion Engineering, Inc.

A Monday afternoon double session dealing with Advances in Data Base Management will kick off the topic. Papers will include "User/System Interface Within the Context of an Integrated Corporate Data Base," "Duchess – A High Level Information System," "Analytical Model for Information Processing Systems," "A Model for a Generalized Data Access Method," "A Data Base Management Problem Specification Model," "Integrating Data Base Management into Operating Systems: An Access Method Approach," "A Prototype System for Interactive Data Analysis," "Data Reference Characteristics of a Data Base Application Program" and "Quantification in a Relational Data System."

A Tuesday morning session, Computer Output to Microfilm, will include presentations on "Computer Output to Microfilm – Past, Present, Future," "MIS – How It Relates to Microfilm," "The Future Role of COM in an Information System" and "The Basics of Computer Input to Microfilm."

Tuesday afternoon will feature a panel discussion on Codasyl and Guide/Share Proposals on Data Base Management Systems including the proposals' differences and similarities.

Humanization of Information Systems on Wednesday morning will cover "Delivery of Social Services: Education," "Benchmark: A Prototype to Improve the Quality and Use of Community Knowledge," "The Human-Machine Interface" and "Key Problems in Humanizing Information Systems: Stanley House Report."

Thursday will begin with a report of the IBM Data Security Study promised two years ago during a keynote speech at the conference by then IBM chairperson T. Vincent Learson.

That afternoon a panel discussion on Research in Data Security – Policies and Projects promises to provide an overview of academic and other research projects in the area.

First thing Friday morning a session on Data Base Administration will include "Data Base: And Emerging Organizational Function" and "Data Bases: Uncontrollable or Uncontrolled."

Later that morning the final session will cover Accessing a Data Base Through a Minicomputer and will include papers on "Interfacing a Back-End Data Base Management Computer," "A Data Base Management Machine" and "Total in a Minicomputer Environment."

Broad POS Spectrum Commands Supplier, Retailer Attention

CHICAGO – A full-day discussion of What Manufacturers Would Like to See Happening in Point-of-Sale will highlight the combined sessions on retailing and distribution systems.

The four sessions on POS will be included in the program which features a total of nine separate sessions on the two topics, according to organizers Gerald T. Montgomery of J.C. Penney Co. and Vernon L. Schatz of The Jewel Co., Inc.

Other topics in the discussion will include standards for retailing, recent developments in reading technology and the impact of POS on data communications.

NCC '74 Sessions

The combined program will be kicked off on Monday afternoon with a special session on The EDP Management Process – Visibility or Vulnerability, which will include a paper on DP management in the retail environment and a panel discussion.

The Pitch . . .

The four sessions on What Manufacturers Would Like to See Happening in Point-of-Sale will all be presented on Tuesday and will feature panel discussions among representatives of the major suppliers of POS equipment today.

On Wednesday morning there will be another panel, this time devoted to Economic Motivation of POS discussing the economics of POS from the retailer's point of view rather than the manufacturer's.

The second session Wednesday morning will delve into the Impact of Point-of-Sale on Data Communications, featuring a panel made up of users and consultants in the area.

Wednesday afternoon there will be another panel, this time discussing Voluntary Standards for Retailing and featuring speakers from major trade associations and the National Bureau of Standards.

The final session that day will be Automated Warehousing and will be highlighted by formal presentations on "Automatic Storage and Retrieval System Control" and "Automated Warehousing for Produce."

. . . And the Windup

Thursday starts out with a session on Store Ordering Systems with papers on "Remote Data Collection Case Study: Telephone Order Processing" and on the "Computer-Aided Ordering System (Caos)."

That afternoon a session on Point-of-Sale Systems for Supermarkets will feature presentations on "UPC and Scanning Defined," "Evaluating Point-of-Sale," "Impact on Statistical Business," "Experience in Use of Point-of-Sale" and "POS – The Promise and the Pitfalls."

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Government Uses Examined

CHICAGO – Five sessions on government, coordinated by Verne H. Tanner, will review data processing applications at the federal, state and local government levels.

Four panelists will discuss the question of the Transferability of Government Information Systems, Problems and Solutions, and Cost Effectiveness in the program's first session on Monday morning.

A second panel that afternoon will take a look at Federal Activities in Information Processing, including their relation to intergovernmental relations and the private sector.

Law Enforcement – Do the Systems Really Provide the Information and Safeguards Promised? is the subject of a panel session Tuesday morning.

Wednesday afternoon, a fourth panel will examine Security, Privacy and the Information Processing System. The panelists will attempt to define security and privacy and to draw the distinction which makes them both severable and related.

The presentation of four papers on the subject of The Cooperative Government Utilization of Information Processing Systems will finish off the program on government Wednesday afternoon. The papers include "Supporting Government Cost Planning of Industrial Wastewater Treatment," "Systems of Information – The Metropolitan Washington, D.C. Approach," "The Data-Base Cluster Concept – A Cooperative Metropolitan Approach to Computer Utilization" and "Trends and Prospects for Cooperative Government Information Systems."

Panels, Papers Discuss Financial Guidelines

CHICAGO – Four panel discussions and a session of paper presentations are included in the program on finance, which has been coordinated by Allen J. Burris.

The first panel, Thursday morning, will discuss Guidelines for EDP Evaluation for Banking.

Thursday afternoon, a panel will review Terminal Systems Applications in the Financial Community, including advanced office automation, bank credit systems, funds management and the new electronic marketplaces.

A panel chaired by George C. Mitchell, vice-chairman of the Board of Governors of the Federal Reserve System, will take a look at Electronic Funds Transfer and Check Collection Developments Thursday afternoon.

Venture Capital for Computer Companies is the title of Friday morning's panel. The discussion will explain the factors investors take into consideration, as well as the characteristics management should look for in the investor.

Auditors Meet

The Auditor's Interface with EDP Systems and Personnel will be the focus of a Friday morning session. The Aicpa's responsibilities and activities in the DP area will also be considered.

Papers scheduled to be presented include "What the Auditor Expects to Find in the Client's Data Processing Installation; When and How the Auditor Should Interface with the Client's Operations and Systems Development Process," "The Concerns and Problems of the Auditor and the Data Processing Manager in an Advanced EDP Systems Environment," "The Effect of the Client's Use of an Outside Data Processing Center on the Auditor's Responsibilities" and "What the Aicpa is Doing to Assist the Accounting Profession in Meeting the Challenge of EDP."

Transportation Advances Cited

CHICAGO – Five sessions have been devoted to the area of transportation, covering DP applications developed independently by the transportation industry in such areas as operations control and system communications.

Program director Paul G. Mercer has gathered representatives from trucking, airlines, railroads and related industries to discuss their unique problems.

Monday afternoon, a panel will give a General Overview of DP Applications in Transportation.

Network Use

Communication Networks in Transportation is the subject for a second Monday afternoon panel. Topics will include communications network planning and implementation, standardization of data interchange, network consolidation and computer-to-computer line control procedures to provide assurance of data interchange.

A Tuesday morning panel will consider Operating Control Through Computers, including the areas of routine, dispatch, maintenance, scheduling, etc.

Also on Tuesday morning, a panel will discuss Equipment Control and take a look at the use of on-line reservation systems.

The transportation program will be concluded Tuesday afternoon with a User Overview of Computerized Transportation-Distribution. The panel, which includes a physical distribution journalist, an MIS manager and three traffic-distribution executives, will discuss logistics development's urgent need for greater DP management participation.

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Users, Developers Explore Views On Hierarchical, Distributed Nets

CHICAGO – The experience of both users and developers will be explored at the seven sessions slated on computer networking.

Both hierarchical networks and local and distributed networks of minicomputers will be covered, as will network standards and interfacing large computers and terminals to networks, according to session organizer Thomas N. Pyke of the National Bureau of Standards.

The first session, Tuesday morning, will

NCC '74 Sessions

cover Large-Scale Computer Network Experiences and feature a panel of five developers and operators of national computer networks.

That afternoon a session on Network Interfaces will include papers on "Interfacing Communication Networks to IBM System/360 and System/370 Host Procesors – An End User's Viewpoint" and a panel discussion on interface problems with such systems.

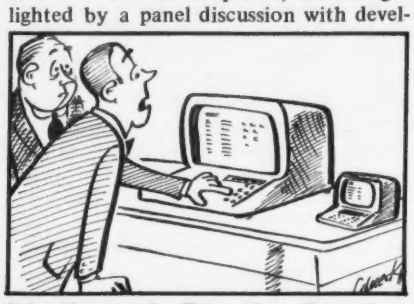
Wednesday morning's initial session, Networks of Minicomputers, will be highlighted by a panel discussion with developers of such systems reporting on their successes and problem areas.

Computer Networking – The User's Viewpoint will be presented later that morning with a panel of major network users suggesting network improvements for the user.

Thursday morning will see another panel session, this time devoted to Hierarchical Networks as seen by people who have used such networks.

That afternoon a major session on Network Performance Measurements will cover such topics as "Computer Performance Variability," "On Measured Behavior of the Arpa Network" and a panel discussion of the various topics.

Slated for Thursday afternoon, the final session in this program will cover "Standards for Computer Networks and will include a paper on "Some Computer Network Interconnection Issues" and a panel discussion on standards, particularly in light of some of the new services being offered in the data networking field.



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Complex Communications Trends Analyzed

CHICAGO – The trend toward larger, more complex communications systems will be analyzed in six sessions under the supervision of Wushow Chou.

Networks, minicomputers, domestic satellites, switching and digital communications on cable systems will be reviewed, with special attention to online systems and the growing integration of data processing and communications.

A Wednesday morning panel on Large Information Processing Networks: Development and Operational Experience will kick off the program.

A second panel that morning on Domestic Satellite Services and Their Impact on Information Processing Networks will delve into the role of satellite communications and wideband circuits in data networking.

Mini- and Microcomputers in Data Communication Systems is the focus of a session Wednesday afternoon, with papers on "A Microprocessor Implementation of a Dedicated Store-and-Forward Data Communication System," "The Multipurpose Batch Station (MBS) System: Software Design" and "The Minicom Data Entry System."

Concepts and techniques combining both practical experience and theoretical techniques for the Planning and Design of Data Communications Networks will be covered Wednesday afternoon in papers which include "Planning and Design of Data Communications Networks," "Planning in the Data Communications Environment," "Effective Use of Data Communications Hardware," "New Line Tariffs and Their Impact on Network Design" and "Tools for Planning and Designing Data Communications Networks."

Friday morning's session on Switching and Sorting Networks will include such papers as "Interconnection Networks: A Survey and Assessment," "An Economical Construction for Sorting Networks" and "Multiconnection Networks."

Friday afternoon, a panel on Digital Communications on Cable Systems will round out the program.

Software Experts Emphasize Operating Systems

CHICAGO – The practical as well as the theoretical will be explored at the 12 sessions devoted to software systems, which will also emphasize operating systems and extensions of present system designs.

Several of the sessions will be keyed to programming languages, particularly those for list processing and machine-independent system programming, according to R. Stockton Gaines of the Institute for Defense Analyses, overall chairman for the sessions.

On Monday afternoon the sessions get under way with "Applications and Exsions of the Tenex Operating System," including papers on "Tenex Management of the Illiac IV," "Transporting Tenex to a New Machine Architecture," The Tenex Resource Sharing Executive – A Step Toward a Network Operating System," "A Commercial Extension of Tenex" and "Use of Tenex RSEXEC by the Terminal Interface Message Processor."

Two of the 12 sessions will be devoted to operating systems, with the Monday afternoon session including papers on "Verifiable Secure Operating System Software," "An Interactive Software Engineering Tool for Memory Management and User Program Evaluation," "Starex: The JPL-Star Computer Resident Executive" and "Dynamic Inquiry of Information About Program Environment."

The Tuesday morning session on Operating Systems will feature papers on "Experimental Data on Page Replacement Algorithms," "Some Programming Techniques for Processing Multidimensional Matrices in a Paging Environment" and "The Double Paging Anomaly."

Also Tuesday morning will be a session on Current Trends in the Software Products Industry featuring a panel with members drawn from the independents, IBM and several market research organizations.

Bell Presents . . .

A major session on A Large Real-Time System Development set for Tuesday afternoon will be devoted to eight papers presented by Bell Telephone personnel on the development of the Safeguard computer system.

Wednesday's sessions will begin with Mathematical Software – Patterns for the Future, consisting of a panel discussion among six experts on expected directions in the field of mathematical software.

The second morning session will be devoted to Artificial Intelligence and Related Topics and will feature presentations on "An Examination of Tic-Tac-Toe-Like Games," "Provable Programs and Processors," "Simulation of Executing Robots in Imperfectly Known Environments" and "A Language-Independent Programmer's Interface."

The first Wednesday afternoon session will be devoted to Software for Computer Systems Acquisition, including the papers: "A Program for Software Quality Control," "Experiences in Cobol Compiler Validation," "A System for Efficient Program Portability," "An Experiment in the Use of Synthetic Programs for System Benchmarking" and a panel discussion with Carl Hammer and Grace Hopper.

Security Kernels

Security Kernels is the topic for the second Wednesday afternoon session which will feature a panel discussion on development of a small, provably correct security kernel that centralizes all security-related functions in an operation.

Thursday leads off with a session on Programming and Programming Languages covering the following topics: "Toward the Development of Machine-Independent Systems Programming Languages," "LPL: A Generalized List Processing Language" and "Generalized Structured Programming."

Snobol Languages on Thursday afternoon will feature a panel on the development of Snobol from a string processing language to a general-purpose programming system.

The final software systems session on Thursday afternoon will present a panel discussing program debugging, particularly in relation to debugging activity today and new tools in development.

Industrial Control Gets Once-Over

CHICAGO – Practical considerations rather than theoretical ones will be the focus of four sessions headed under the topic of industrial process control, according to session organizer William Tabachnik of Mobil Oil Corp.

The first session, Wednesday morning, will cover Hardware and Software Concerns Relating to Industrial Processes and will feature presentations on "Digital Control Algorithms – Design and Application Considerations," "Program Language Selection," "Input-Output Requirements for Process Control," "Microcomputers in Industrial Processes," "Data Highways" and "Man/Machine Considerations in Future Process Control Systems."

That afternoon the second session in the program will highlight the topic of Applying Computers in the Research and Development Laboratory from the viewpoint of four panelists: two laboratory computer users, a systems designer and a computer manufacturer.

Thursday morning will see a presentation on Computer System Design Consideration for Control Applications, including papers on "Use of a Multiprogramming Minicomputer for Real-Time Control Applications," "A Data Bank for On-Line Process Control," "Design of a Minicomputer Network for Automatic Determination of Amino Acid Sequences in Proteins" and "An Approach to the Optimization of an Olefins Plant."

The final session – Thursday afternoon – will cover Selected Topics on System Simulation and Interaction, including discussions of "Effective Demonstration of Minicomputer-Based Systems by a Novel Digital Simulation," "An Optimal Pollution Surveillance Schedule Generating System (Opgens)," "Use of a Microcomputer in a Missile Simulation" and "Twenty Commandments for Managing and Development of Tactical Computer Programs."

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Associative Processing Key Topic of Hardware Papers

CHICAGO – State-of-the-art and key areas of computer architecture and hardware will be covered in 11 separate sessions under the direction of Professor C.V. Ramamoorthy of the University of California, Berkeley.

Current technology will be overviewed and new directions identified.

Special attention will be given to key topics such as associative processing technology and mass memory.

In addition, several sessions will emphasize the development of graphic displays and intelligent terminal technology.

Associative Processing and some potential applications will be scrutinized in a session Monday afternoon, with papers on "Some Problems in Associative Processors and Data Base Management," "Radcap: An Organizational Parallel Processing System," "Staran Parallel Processor System Software" and "Some Thoughts on Associative Processing Languages."

Do I Hear a Voice?

The topic of Computers in Communications and Voice Recognition will be explored Monday afternoon with papers including "Integrated Voice/Data Compression and Multiplexing Using Associative Processing" and "Speech as a Man-Computer Communication Channel."

A session Tuesday morning, entitled Intelligent Terminals – Rationale & Implications, will consider the interrelations of the different parts of a telecommunications system which include intelligent terminals.

The five papers scheduled for the session are "The Rationale for Intelligent Terminals" and one paper each on the hardware, software, communications and user implications of intelligent terminals.

A panel session on Tuesday morning will be devoted to The Effect of Changing Technology on Computer Graphic Systems (SID).

Display Processing and Technology is the subject of a Tuesday afternoon session which will feature the following papers: "Display Techniques for Interactive Text Manipulation," "Line Processor: A Device for Amplification of Display Terminal Capabilities for Text Manipulation," "Hardware/Software Design Considerations for High-Speed/Low-Cost Interactive Graphic Communication Systems" and "The Graphix I Impact Processing System."

Three papers will be delivered Tuesday afternoon in a session dealing with System Implementation Techniques. They are: "APL as a Development Tool for Special-Purpose Processors," "Narrowing the Generation Gap Between Virtual Machines and Minicomputers" and "Pipelining – The Generalized Concept and Sequencing Strategies."

Representatives of four manufacturers of "number crunchers" will examine the Operation Status of Large-Scale Data Processors Wednesday afternoon with papers on "The Control Data Star – 100 Performance Measurements," "Operational Experience with the TI Advanced Scientific Computer," "Multiprocessor Performance Analysis" and "Staran Parallel Processor System Hardware."

Low-cost microprogram storage will be the topic of two papers at Wednesday afternoon's session on Microprogramming Technology. They are "Design Considerations for Microprogramming Languages" and "A Flexible Disk Controller."

"Efficiency in Generalized Pipeline Networks," "An Approach to the Design of Highly Reliable and Fail-Safe Digital Systems" and "A Study of Fault-Tolerant Techniques for Associative Processors" are the paper titles for the Thursday afternoon session on Architectural Parameters.

A user and four vendors will take a look at Mass Memory Systems Thursday afternoon. The topics include "Mass Memories – An Overview," "Mass Storage System Implementation Approaches," "Software Requirements for Mass Storage Systems," "The Scroll Mass Memory System" and "Technical Evaluation of Mass Storage Systems."

A Thursday afternoon session will take a look at Advances in Memory Technology with papers entitled "Capabilities of the Bubble Technology," "DOT Memory Systems," "Charge-Coupled Devices for Computer Memories," "Block-Oriented Random Access; MNOS Memory" and "The Storage Subsystem."

How Are You Managing DP Resources?

CHICAGO – Companies are devoting more and more attention to how they manage their computer resources and this increased awareness on the part of management will be reflected in nine sessions.

Provisions of cost effective data processing services will be approached from several different viewpoints, including utility computing and the concepts behind distributed systems, according to James A. Schweitzer of Xerox who organized the sessions on management acceptance.

Utility Computing: A Superior Alternative? will be the subject of a Monday afternoon panel discussion focusing on how large computer utilities are now challenging the idea of in-house computing.

Tuesday will lead off with another panel on Structured Systems Development which will discuss the need for and possible benefits from a more structured or standardized approach to systems development projects.

Enter, the Computer

That afternoon another panel will focus on Management Impacts of Distributed Computing and Computer Networks, focusing on the power and organizational shifts brought about in organizations by the introduction of computer networks.

Wednesday morning there will be three papers on the subject of The High Cost of Software: Causes and Correction, plus a panel discussing the papers and the general topic. The paper titles include "Embedded Computers: Software Cost Considerations," "Automated Monitoring of Software Quality" and "Understanding the Software Problem."

The second session that morning will cover Improving Computer System Effectiveness including papers on "Guidelines for the Use of Infinite Source Queuing Models in the Analysis of Computer Performance," "Data Base Concepts Applied to Generalized Programming Packages" and On-Line User-Computer Interface: The Effects of Interface Flexibility, Terminal Type and Experience Performance."

Using DP Well

The Effective Use of Computers is slated for Wednesday afternoon including papers on "Productivity of Computer Installations," "Assessment for Potential Computer Programs," "Reassessment of Operative Computer Programs" and "What Computer Center Management Should Know About Their Systems' Performance."

Following that there will be a session on Computer Center Management, including discussions of "Management of Centers," "Security – Physical and Data Base" and "Distributive Computing."

Thursday leads off with Technology Investment Management, including presentations covering "Computer Performance Analysis in Mixed On-Line/Batch Workloads," "Systems Performance Measurements – A Quantitative Base for Management of Computer Systems," "Two Hat Management: Project Management with a Difference" and "Controlled Testing for Computer Performance Evaluation."

Thursday afternoon there will be a session on Charge Out Systems for Management Acceptance and Control of the Computer Resource, featuring a paper on the same topic.

Friday morning, the Special Libraries Association will present a session on Accelerating Information Delivery. Papers will include "OCLC, Networking On-Line," "Computer Usage in a High School Library" and "Information Services for Specialized Users."

The final session on the program will be on Certification of Computing Personnel: Prospects and Potential Impact, presented by the Association for Computing Machinery. Papers include "Techniques of Effective Test Development," "Professional Certification and the Impact on the Individual Practitioner," "Certification and Its Impact on Management," "Impact of Certification on the Computing Industry" and "Impact of Certification on Society."

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Medics Cover Data Acquisition, Patient Monitoring

CHICAGO – Clinical and biomedical data acquisition and analysis, patient monitoring and hospital information are among the topics to be covered in the eight Health Care and Biotechnology sessions, according to Walter S. Huff Jr., program director.

The program begins Monday afternoon with a session on Information Systems for Health Care, comprised of papers on "A Public Health Data System," "Automated Patient Record Summaries for Health Care Auditing," "An Integrated Health Care Information Processing and Retrieval System" and "Interface for Rapid Data Transfer and Evaluation."

Information Systems for Ambulatory Care will also be covered Monday afternoon in a separate session featuring the following papers: "Development and Implementation of a Medical/Management Information System at the Harvard Community Health Plan," "Are Ambulatory Medical Records Cost-Effective?" "Computerized Health Records in an Extended Ambulatory Care System," "Computers in the Physician's Office" and "Evaluation of Ambulatory Care Information Systems."

NCC '74 Sessions

"Effective Planning for, and Justification of the Extension of Data Processing in Hospitals," "Resource Allocation and Planning Systems for the Development and Operation of Health Care Delivery Systems" and "Medical Data Processing in the U.S." are the three papers to be delivered Tuesday morning at the session on health care planning and acceptance of computer systems.

Tuesday morning's program includes a panel discussion on Terminal Hardware and Methodology in Hospital Information Systems (HIS) – both the data collection and message switching type and the HIS with medical record type.

Papers to be delivered during the Tuesday afternoon session on Applied Medical Applications include "Care System to Medical Therapy of the Critically Ill," "Computer-Assisted Therapy for the Critically Ill" and "Automated Autopsy Reporting Systems."

Computer Algorithms for Analyzing Patient Data, including the choice of therapy once a disease presence has been established, will be the topic of a Wednesday morning session. Scheduled papers are "An Overview of Computer-Assisted Clinical Methods," "A System for Computer-Based Medical Consultation" and "Help – A Computer System for Medical Decision Making."

Another Wednesday morning session will focus on Computer Simulations of Aspects of the Diagnostic Process, aided by papers on "The Physician-Computer Interaction," "Prediction of Suicide Attempts with Computers" and "Suggestions for a Solution to the Formal Diagnostic Problem."

The final session in this program, Wednesday afternoon, will center around The Prophet System and Computing in Pharmacology. "The Implementation of the Prophet System," "Applications of the Prophet System in Correlating Crystallographic Structural Data with Biological Information," "Applications of the Prophet System in Molecular Pharmacology: Structure Activity Relationships in Monamine Oxidase Inhibitors," "Applications of the Prophet System in Human Clinical Investigation" and "Measurement and Enhancement of Prophet System Performance" are the papers scheduled for presentation.

Six Special Programs Include Privacy Panel, Dartmouth Celebration

CHICAGO – In addition to the regular programs, six special sessions have been scheduled to round out the overall program.

The first of these special sessions, Tuesday afternoon, deals with Computer Developments and Applications Outside the U.S. The panel will consist of experts from Japan, Brazil, France and Austria.

The major societal issue of computer and personal privacy will be the focus of a panel discussion Wednesday morning. Two panelists will summarize the experience of Sweden with its data act and the experience of a major company with the Fair Credit Reporting Act. Other panelists will discuss the issue from the point of view of business and its data processing obligation.

A three-part session Wednesday afternoon marks the 10th anniversary of the inauguration of time-sharing at Dartmouth College. First, the users view will be given, along with a paper entitled "Project Find: An Integrated Information and Modeling System for Management."

In a second session, panelists will discuss important issues related to integrated information processing systems, with special emphasis on the solutions and techniques employed in the case of DTSS.

And finally, John G. Kemeny and Thomas E. Kurtz will reminisce with a group of former students on the genesis of DTSS.

Thursday afternoon, a panel will consider the question of Energy in an Evolving Society, with a discussion of several specific aspects of the nation's present and future energy situation.

Computing and Mathematics in Society is the topic for a Thursday afternoon panel. "Computers in Real-World Biological Systems," "Computers in the Study of Social Processes," "Management Information Systems for Energy Distribution" and "Mathematical Modeling of Urban Emergency Service Vehicle Deployment Policies" are the titles of papers to be presented during this session.

The final special session will deal with the subject of Computers, Communications and the Regulatory Environment. The panel will include representation from AT&T, specialized and value-added common carriers, users and regulatory experts.

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CI Notes

Win a Memory at NCC

CHICAGO – Answer 14 questions at the Ampex booth 645 at the National Computer Conference and you may win $23,000 worth of free core from the Ampex Memory Products Division.

The winner may select either a 32K-memory expansion core for the MD-10 memory; a credit against the purchase of an Ampex equivalent to the MD-10 memory with a capacity of either 32K or 64K words; or a credit against the purchase of a 256K-word capacity Ampex ARM-10 memory.

Ampex estimated the odds of winning at 500 to one.

CDC Adds 3270-Type to Line

MINNEAPOLIS – Control Data Corp. will be offering a plug-compatible replacement for the IBM 3270 information display system, as the result of an OEM agreement with Computer Optics, Inc. for the purchase of Computer Optic's CO:77.

The contract grants manufacturing rights to CDC under certain conditions, and Daini-Seikoska Co., Ltd., the parent corporation of Computer Optics, agreed to provide the necessary financial support to Computer Optics to assure performance under the contract.

Incoterm Wins McAuto Pact

NATICK, Mass. – Incoterm Corp. has signed a three-year purchase agreement to supply McDonnell Douglas Automation Co.'s (McAuto) Hospital Services Division with intelligent terminals.

The three-year contract, valued at $5 million, includes an initial purchase of Incoterm SPD 900 intelligent remote-batch terminals and SPD 20/20 intelligent computer terminals.

Supershorts

Burroughs Corp. has been licensed by University Patents, Inc. for patents included in the Dirks patent portfolio. The licenses are for inventions on disk drives, disk and drum controllers, tape controller, sort methods and on the fly record updating.

– – –

Scientific Measurement Systems, Inc. has received a patent on its SMS Series 100 alphanumeric tape display.

– – –

Computer Automation, Inc. has appointed Datacare AG as its exclusive sales and distribution agent for Switzerland.

– – –

Honeywell plans to establish an engineering and production facility for solid-state devices in Colorado Springs, Colo.

– – –

Data General Corp. has delivered its 10,000th Nova, a Nova 480, to the European Center for Nuclear Research in Geneva, Switzerland.

Secrets Theft Case

Ex-Defendant May Sue IBM on Charges

By E. Drake Lundell Jr.
Of the CW Staff

SANTA CLARA, Calif. – IBM may soon be sued by one of the men it accused of stealing IBM trade secret information.

All charges against W.O.J. Arnold, vice-president of Athana, have been dropped in the action, but his lawyer, Richard A. DeSantis, said last week that he had been "authorized to proceed against IBM" and that the filing of a suit was "extremely likely."

Arnold was indicted in July 1973 along with 100 other people in the San Jose, Calif., area for theft of IBM trade secrets, but charges were dropped against him and two others two weeks ago [CW, April 17].

In addition, Judge Peter Anello recently dropped charges in the case against Phillip Kronzer, vice-president of K&K Manufacturing; making the San Jose 11 the San Jose 7.

In fact, many legal sources indicated much of the case against the group may be crumbling, since the district attorney here has indicated many of the items IBM is claiming as trade secrets really aren't entitled to trade secret protection, according to the law.

"It is our opinion that among the basic reasons for this dismissal," DeSantis said in reference to the Arnold case, "was the fact that the IBM Corporation had misinformed the district attorney's office in some aspects of this matter, and that some members of the district attorney's staff had found that the assumptions upon which the indictment rested were in fact not supportable in evidence."

And Deputy District Attorney John Marshall has indicated the IBM claim to trade secret protection of part of the 2314 disk drive is "just not such as to fall within [the scope of the trade secret] statute."

In arguing that the charges against Kronzer be dismissed, Marshall also noted any information within Kronzer's possession at the time of the indictment "came into his possession properly."

The information in question related to the carriage assembly for the 2314, a product that K&K was manufacturing for IBM, was not marked confidential nor subject to any confidentiality agreements between Kronzer and IBM, Marshall noted.

The charges against Arnold and the other defendants in the case have been dismissed "with prejudice" which means that the district attorney cannot bring any new charges against the defendants for IBM trade secret violations even if new information is gained in the current investigation.

The judge criticized the district attorney's office and IBM when dismissing the charges against Arnold, but specifically excluded the District Attorney from any possible prosecution for its role, while indicating that Arnold might well have a case against IBM for its role in the matter.

And DeSantis added that Arnold "is, in my opinion, entitled to redress from those who sought his prosecution," even though he could not comment on an exact time for filing of a suit or the specific charges.

Several industry figures have questioned the timing of the arrest of the San Jose 11 on the trade secret charges, noting that the arrest was made – and received wide coverage – at a time when Judge A. Sherman Christensen was making his decision in the Telex case – another area where trade secrets played a large role.

Some industry figures claimed IBM had had information on possible threats to its security at its San Jose disk drive facility for as much as three to four years and wondered why it chose not to press for action until the time of the Telex suit.

Census Shows U.S. DP Shipments Totaled $6.23 Billion in 1972

WASHINGTON, D.C. – The value of DP equipment shipped by all U.S. manufacturers in 1972 totaled $6.23 billion, of which $5.6 billion was shipped by DP makers, according to the preliminary report of the 1972 Census of Manufacturers.

The total value of products shipped and miscellaneous receipts of firms classified in the computer industry totaled $6.49 billion or 72% above the 1967 figure of $3.77 billion. The figure in 1971 was $5.23 billion.

An even higher increase, 86%, was revealed in the value added by manufacture, which totaled nearly $3.6 billion in 1972 compared with $1.93 billion in 1967.

The value-added figure avoids duplication in the value of shipments resulting from the use of products of some firms as materials by others.

Overall employment in the industry and the number of production workers both grew from 1971 to 1972, with a total of 62,900 production workers in 1972 and 61,100 in 1971.

However, the number of production workers in the industry is still less than in either 1970 or 1969, when there were 67,000 and 69,800, respectively.

Capital Expenditures Decline

New capital expenditures and end-of-year inventories both showed declines compared with 1971.

Capital expenditures dropped to $216.3 million from $248.7 million, and end-of-year inventories fell to $1.56 billion from $1.62 billion in 1971.

Receipts from general-purpose computers totaled $1.72 billion in 1972, while special-purpose machines totaled $234.3 million. These figures include inter-industry shipments.

Printers topped the field of input/output equipment, with $242.8 million in 1972, while card punch, key-to-tape and disk devices totaled $95.9 million.

The census lists terminals as totaling $132.2 million. No figures are available for 1971.

60s to Bridge GE, HIS Lines

By Ronald A. Frank
Of the CW Staff

BILLERICA, Mass. – With the announcement of the Series 60, Honeywell enters into probably its most difficult phase since the merger in October 1970. It has up to now been essentially enhancing existing equipment drawn from both the pre-merger GE and Honeywell lines.

The Series 60 seems aimed at gradually moving the customer base into a smaller number of systems that undoubtedly will simplify support problems compared with the dual system architectures now in the product line.

Honeywell President Stephen Keating said the Series 60 will be a positive force in the overall corporate objective of increasing the firm's revenue by 10% to 12% per year with a projected 15% average gain in earnings.

Since 80% of the company's business (by its own figures) comes from the existing customer base, there has obviously been a major emphasis on making the new line upward-compatible from both the former Honeywell and GE equipment.

Whether this means the Series 60 has slighted the 20% that HIS hopes will convert from other vendors remains to be seen.

The new family was developed in the U.S., France, Italy and West Germany, and some of the models will be excluded from the domestic marketplace because they meet specific needs of overseas customers.

Manufacture of peripheral equipment will be divided among Oklahoma City, France, Italy, West Germany and the UK, according to Honeywell.

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International Cooperation Needed

CDC Canada Site Assumes Bigger Role

By Vic Farmer
Of the CW Staff

MISSISSAUGA, Ont. – Control Data's Canada operation has become an important entity in the corporation now that CDC has announced it did nearly all the engineering and design of its Cyber 170 Series here.

The Cyber 170s are an improvement over the earlier Cyber 70 computers in that they use integrated circuit logic and Metal-Oxide Semiconductor (MOS) memory as opposed to discrete components and core memory.

The Mississauga plant is just over three-years-old, has 430 employees, very few of whom are U.S. citizens, and was responsible for the export of $23 million of computer equipment last year alone.

The Canadian Government gave the firm $19 million in 1970 to help establish the DP mainframe industry in Canada.

William C. Norris, CDC chairman and chief executive officer, admitted that cooperation between company and government has become more important now that the easy, technological advances have been made.

This partnership, according to Norris, "is proving to be a more effective method of meeting the ever-expanding needs for computers, but also is gaining recognition as the best way of solving many long-term, worldwide problems more expeditiously."

Teamwork Vital

Norris attributed the need for government cooperation to the premise that all the easy goals in high technology have been reached. It was easier to invent the computer than it is to use it most effectively, he noted.

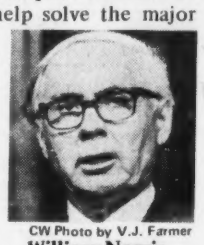
"There remain so many things to be done to improve productivity and the quality of life everywhere through the use of computers and the cost and difficulty are so great that progress can be made faster through cooperation and pooling of resources than through individual enterprise alone."

CDC, consequently, is seeking other cooperative arrangements in other countries, he said.

Norris warned that unless more companies and governments throughout the world cooperate, solutions will be delayed, and even lost, to the major crises of energy, environment, food, transportation, education and health care.

He pointed out that it has become increasingly clear that the U.S., a country with the most technological resources in the world, by itself does not have the resources to adequately solve long-term energy and environmental problems, but must seek the help of other nations.

Only cooperation between nations and different companies will be effective, he said. Computer technology development needs help as well, for applications of computers will be needed to help solve the major problems of today and the future.



CW Photo by V.J. Farmer
William Norris

Norris envisioned the CDC-Canada partnership would bring about a stronger world computer industry while enabling more nations to share in the rewards of the business.

While the Cyber 170 Series was designed in Canada, most of the computers for the U.S. domestic market will probably be produced near St. Paul, Minn. The Mississauga plant will build Cyber 172, 173, and 174 systems for international markets other than the U.S. One of the major problems in producing computers in Canada is that integrated chip and MOS chip facilities capable of supplying CDC components are mostly in the U.S.; but CDC evidently intends to help some Canadian companies become local suppliers of circuits.

The difference in cost to the user for MOS memory over core, for example, is that of 15 cent/bit for core verses 6 cent/bit for MOS circuitry.

Meanwhile, CDC is planning to demonstrate its Star computer – reportedly the biggest and fastest computer in the world – within the next several months.

Tymshare, On-Line Restructure Marketing

Two time-sharing firms, Tymshare, Inc. and On-Line Systems, have restructured their marketing organizations.

Tymshare has named three sales vice-presidents: Gary Myers, Western and Southern U.S.; Robert L. Schwartz, Eastern and Midwestern U.S.; and Walter Eissmann, who will direct all Marketing Division staff operations.

The move is intended to enable Tymshare to be more responsive to customer requests, the firm said.

On-Line created new Eastern, Western and Government divisions that more accurately reflect the company's marketing emphasis, the firm said.

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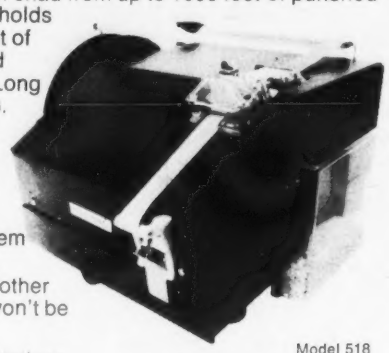

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'LEASING SPECIALISTS'

Honeywell Has Record; Unit Hurts CDC

Honeywell, Inc. managed a record first quarter with revenues increasing 11% and earnings nearly 15% above those of the same 1973 period, but at Control Data Corp. a decline in earnings of Commercial Credit more than offset a 23% rise in earnings from computer operations during the first quarter ended March 31.

Honeywell quarterly earnings reached $19.4 million or $1.01 a share, including $1.1 million in special credits, compared with $16.9 million or 89 cents, including a $786,000 special credit.

Revenues rose to $588 million from $530.8 million a year ago.

Incoming orders as well as revenues in almost all segments of the business were well ahead of last year's first quarter and backlogs at the end of March remained high, President Stephen F. Keating noted.

In the computer segment, revenues increased 10% over the year-ago quarter, although net shipments were down slightly.

Backlogs were larger because bookings were up about 15% from last year's first quarter. Net bookings reached a record level for a single month in March, reflecting strong acceptance of the 6000, 2000 and Series 50 systems, the firm said.

Computer rental and service revenues rose 8.8% to $169.5 million from $155.7 million a year ago.

Keating pointed out that inflation and increasing labor and materials costs exerted some pressure on margins in certain product areas, particularly in the Residential and Micro Switch areas.

Profit margins were also squeezed somewhat by higher interest costs, but a lower effective tax rate partially offset this factor, he said.

Price increases in several product areas, while announced in the first quarter, will not become fully effective until later in the year, he added.

CDC Earnings

At CDC, earnings dropped to $14.8 million or 91 cents a share from $16.7 million or $1.03 a share in the year-ago period, although revenues rose to $249.4 million from $207.1 million.

While earnings from the computer operation rose to $4.5 million from $3.7 million a year ago, earnings of the firm's financial services arm, Commercial Credit Co., dropped to $10.3 million from $13 million in the same 1973 period.

Chairman William C. Norris said the continued pressure of high short-term interest rates was the principal factor in the decline. However, the company anticipates a decline in rates during the latter half of this year, he added.

Based on orders received in the first quarter and the forecasted decline in interest rates, management anticipates an earnings increase for the full year over 1973, Norris said.

Calcomp Revamps

ANAHEIM, Calif. – California Computer Products, Inc. (Calcomp) has effected changes in its management structure to "provide integrated management control of the functional elements of all our graphics and memory products organizations," according to President Lester L. Kilpatrick.

Richard I. Tanaka, senior vice-president, is responsible for worldwide marketing and field engineering for all graphics and memory products.

Fred Schudel, vice-president, is assigned total manufacturing responsibility for graphics and memory products.

George M. Canova, executive vice-president, will serve as acting senior vice-president of engineering.

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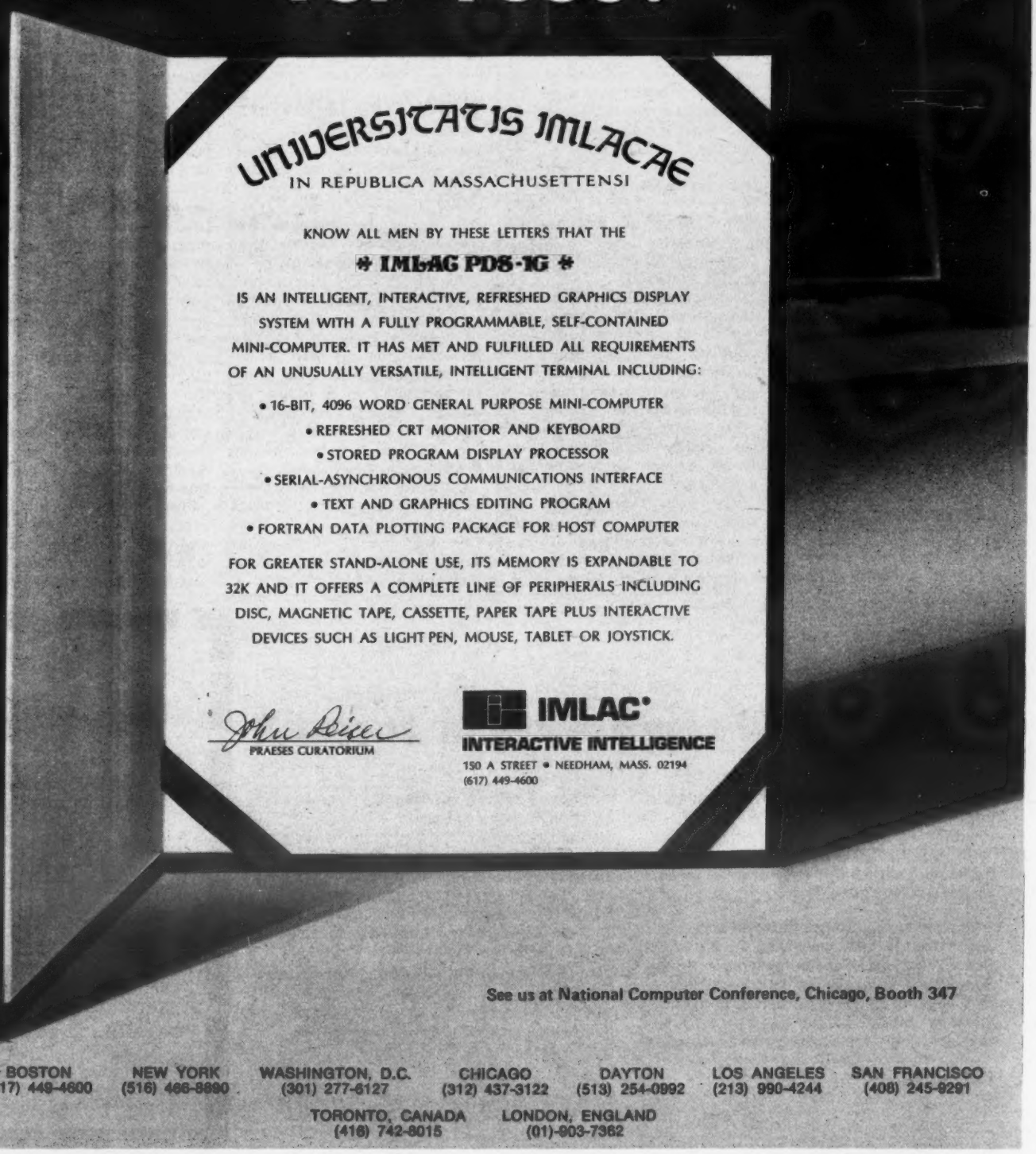

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Savings Cited With DP, Control Units

By Vladimir Myasnikov
Novosti Press Agency

MOSCOW – The use of automatic control systems (ACS) and computers during the Five-Year Plan (1966-1970) saved a total of $863 million, according to data from the USSR Ministries and Departments and the State Planning Committees of the Union Republics.

In 1966 there were no ACSs in operation and in 1970 there were over 400. Currently there are 800 ACSs in operation.

During the current Five-Year Plan period (1971-1975) the USSR plans to put into operation almost 2,000 ACSs and over 700 automatic technological control systems.

By the end of 1975 they are scheduled to be operational at every fifth major industrial facility and at nearly all Union Ministries and Departments.

Costs of building an industrial ACS are repaid in two to three years, and will be even less when standardized software is in use.

A number of industrial enterprises can boast of large returns over the initial investment in developing ACSs.

For instance, at the Lvov television equipment plant, the return on ACS investments is three times higher than those in other fixed assets.

An examination of 118 machine-building and metal-working industrial plants showed that the employment of ACSs increased labor productivity 6% to 8%, while nonproductive waste decreased by 5% to 6%.

The operation of branch and territorial ACSs is far more efficient. The USSR's first ACS, commissioned in the country's instrumentation industry, repaid all investment costs within one year of operation.

Planned economy, centralized management and public ownership of the means of production open up vast opportunities for the operation of automatic control systems at various levels of production and management.

The Soviet Union has assigned top priority to the coordination of all branches of the national economy.

The 24th Congress of the CPSU advanced as a long-term target the development of a nationwide automated system for collecting and processing information for the purpose of accounting, planning and managing the country's national economy.

The system will be based on a national network of computing centers and a unified automatic communications system.

So far, one can only speak of the general scheme of the gigantic system, though some practical measures toward its realization are already under way. The network of computing centers under construction is based on both industrial and territorial principles. They are to be linked through a nationwide data transmission system which is viewed as part of the unified automatic communications system. The nationwide automatic system will also include functional systems for planning estimates, state statistics, standardization and meteorology, control of scientific and technological progress and processing of cost information.

View from USSR

The work will be conducted in stages with the gradual introduction of new ACSs and computing centers that will expand the scope of problems tackled.

The development of electronic hardware for economic and industrial management is proceeding rapidly. The work will be greatly facilitated by the mass production of electronic computers for the unified control system.

Myasnikov is head of the Main Department for Computer Technology and Control Systems of the State Committee for Science and Technology under the USSR Council of Ministers.

Operation Begun in December

Poland a Trend-Setter in DP Leasing

By Bohdan O. Szuprowicz
Special to Computerworld

WARSAW, Poland – Poland is setting a new trend in Eastern Europe by being the first Comecon state to introduce computer leasing to end users.

This move may be part of an overall policy to accelerate computerization of the Polish economy by making it more broadly accessible.

Until now, all computers, whether manufactured in the East or the West, were purchased for cash or bartered for by the Foreign Trade Organizations acting on behalf of the end users.

The first leased computer installation began operations last December here and includes DP equipment valued at almost $1 million, which is operated by a Teachers Housing Cooperative, "Oswiata," which formed its own DP organization.

The center includes a second-generation Polish-made Odra 1304 CPU with 32K words of memory, four tape drives, four memory drums, paper tape reader and punch, card reader and a line printer all manufactured by the Polish Elwro company.

In addition, the installation includes Czech-made Consul paper tape perforator and Aritma card punch.

The lessor of the equipment is the Mera-Elwro-Service organization of Wroclaw, Poland, which suggested the leasing agreement to the Teachers Housing Cooperative.

Mera is responsible for design and production of computers and instruments, Elwro is the specific computer manufacturer in Poland and Elwro-Service is the manufacturer's installation, maintenance and user support organization for Odra and other imported computers within the operating scope of the organization.

Elwro-Service has branches in many cities throughout Poland and even in foreign countries where Polish Odra computers are installed, as in East Germany, Czechoslovakia, Hungary and the Soviet Union.

Warsaw alone has about 60 Odra computer installations and that number is growing rapidly.

The leasing arrangement appears to be solving the problems of both organizations involved. The Mera-Elwro-Service was looking for office space in Warsaw to house the Odra computer as a backup machine for its growing number of users in that city and the Teachers Housing Cooperative, involved in financing, construction and rent control of housing for teachers, was looking for an alternative to rising costs of service bureaus where it ran programs for its cash flow accounting.

The Odra 1304 at the center is operated on three shifts. The first two shifts are used by the Teachers Housing Cooperative for its own work while Mera-Elwro-Service uses the third shift for client service purposes.

It is expected the present computer will soon be replaced by a third-generation Odra 1305 machine with disk drives.

The Teachers Housing Cooperative also sells machine time, mostly to other housing cooperatives eager to use the special programs developed by the group.

The central union of housing cooperatives in Poland is promoting the use of computer systems developed by the "Oswiata" cooperative.

Who's Who in Soviet?

WASHINGTON, D.C. – An index that lists about 300 products and identifies the Foreign Trade Organization (FTO) of the USSR Ministry of Foreign Trade that handles their purchase and sale is available from the U.S. Department of Commerce.

"The FTOs carry out the purchase of foreign goods and the sale of Soviet products abroad on behalf of their domestic customers and usually have the exclusive trading rights for particular product categories," the booklet stated, noting that "actual purchasing decisions in the USSR are normally made by the end users themselves."

Copies of "Foreign Trade Organizations in the USSR: Product Index and Directory" are free from the Bureau of East-West Trade, U.S. Department of Commerce, Room 4044, 20230.

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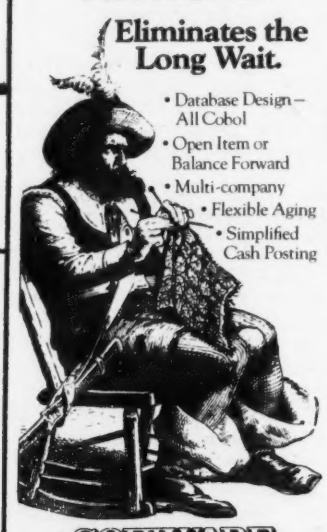

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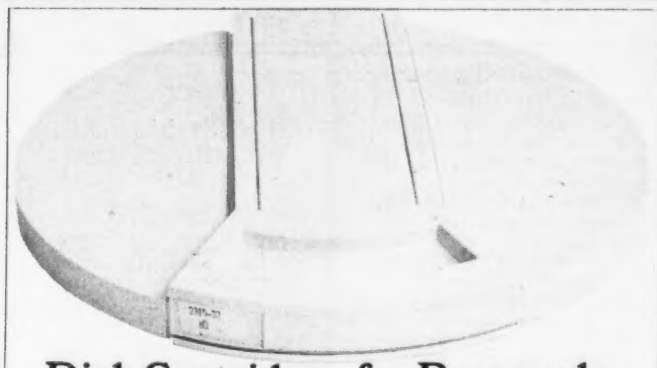

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DAYTON, Ohio – Aided by the impact of cost-cutting programs, NCR scored record first quarter results with earnings soaring 62% to $12.1 million or 51 cents a share. This compares with $7.5 million or 32 cents a share in the year-ago quarter.

Revenues also reached a new high of $387.3 million, up 5% from $367.4 million in the same 1973 period.

The cost-cutting programs, undertaken last year, had not impacted the first quarter of last year, the firm pointed out.

International Scene

The computer segment of the business, which first became profitable last year, continued to contribute to earnings.

On the international scene, the adverse effects of reduced production in Dundee, Scotland, because of the energy crisis, were largely offset by earnings gains in other markets including Japan, Spain and Switzerland, the firm said.

Revenues in the U.S. during the quarter rose only slightly because of the major marketing reorganization, which has necessitated extensive transfers of personnel and higher than normal involvement of marketing representatives in training programs, NCR said.

"In view of the magnitude of this reorganization program, it was anticipated that there would be an initial period of adjustment," President William S. Anderson said.

"However, the many long-term advantages of this new industry-oriented marketing approach far outweigh its temporary impact," he added.

Although domestic orders for the year to date are running behind last year's pace, incoming business abroad continues to establish new records, Anderson said.

NCR Expects Revenues of $2 Billion In '74, Capital Expenditures to Rise

NEW YORK – NCR expects revenues to be about $2 billion in 1974, President William S. Anderson told securities analysts recently. In 1973, NCR revenues totaled $1.8 billion.

Revenues from computer operations should grow more than 25% this year, while revenues from data terminals should more than double from last year's $153 million, Donald L. McIntosh, vice-president, finance, said.

But along with increases in revenues come rising expenditures, a considerable part of which will be funneled into the computer segment of the firm.

NCR plans to increase its capital expenditures 21% to $225 million from $186 million last year. Most of the increase is due to a "substantial rise in expenditures for new manufacturing equipment and the continuing growth of NCR's computer rental business," Anderson said here recently.

"Our investment in rental equipment this year will constitute more than half of the capital expenditures total," he noted.

In addition, R&D expenditures will rise to over $60 million from $52.4 million last year, and NCR foresees even larger R&D increases over the next several years, he added.

"The bulk of these expenditures will be for EDP software and hardware and additional data terminal products," Anderson said.

NCR anticipates consistent earnings growth from these operations, he remarked.

NCR's computer revenues last year rose 45% to $328 million, which does not include revenues from field engineering, computer-linked data terminals, continuous forms and other supplies, or special-purpose minicomputers which form the nucleus of NCR's new computerized retail systems, he added.

Earnings Triple At Fabri-Tek

MINNEAPOLIS – Nine-month earnings at Fabri-Tek, Inc. tripled while third quarter earnings rose to $612,639 or 19 cents a share from $390,022 or 11 cents a share in the same year-ago period.

Quarterly income includes a $181,382 special charge resulting from an adjustment of the tax credit.

Revenues for the three months rose to $12 million, including $2.2 million from the recently acquired Digiac Corp., compared with $5.9 million a year ago.

In the six months, earnings rose to $1.7 million or 51 cents a share compared with $506,029 or 15 cents a share last year.

Revenues totaled $28.3 million compared with $15.7 million in last year's half year.

Fabri-Tek Circuits has exceeded its profit targets throughout the nine months and is expected to finish the year well ahead of plan, the firm said.

The performance of Digiac, an educational systems company, has not been up to plan, but Fabri-Tek said it expects a "significant" improvement in this area when educational funds approved by Congress are released by the Executive Branch.

Acquisitions

General Automation, Inc. has agreed to purchase **Tal-Star Computer Systems, Inc.** for an undisclosed amount of cash and common stock. Tal-Star systems, designed for use in the newspaper industry, use General Automation hardware.

Boeing Computer Services, Inc. has acquired **SCS Data Processing** of Anchorage, Alaska.

National Information Systems Corp. has agreed in principle to merge with a corporation to be formed by **Electronic Data Systems Corp.** The merger is subject to approval by NIS shareholders.

FX Systems Corp. has acquired the **Digitem** line of industrial data-acquisitions systems from **Microwave/Systems, Inc.**

Xoma Ltd. and **Delstar Data Processing Ltd.** have agreed in principle to merge operations.

Information Magnetics Corp. (Infomag) has purchased the manufacturing operations of **Magnetic Head Corp.**

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☐ Chicago	6/19	☐ Milwaukee	6/20	☐ San Francisco	4/18
☐ Cincinnati	5/8	☐ Minneapolis	5/22	☐ Seattle	5/14
☐ Cleveland	6/12	☐ Montreal	5/9	☐ St. Louis	5/21
☐ Detroit	5/15	☐ New York	6/12	☐ Toronto	4/24
☐ Greensboro, N.C.	6/5	☐ Philadelphia	6/4	☐ Washington	6/5
☐ Hartford	5/23	☐ Phoenix	5/17		

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The Data Analyzer

Earnings Reports

DATA DIMENSIONS
Year Ended Dec. 31

	1973	1972
Shr Ernd	$.30	$.05
Revenue	2,935,400	2,199,200
Tax Cred	109,000	11,000
Earnings	235,400	36,700

BALTIMORE BUSINESS FORMS
Year Ended Dec. 31

	1973	1972
Shr Ernd	$.70	$.02
Revenue	18,939,000	a16,724,000
Earnings	522,000	58,000

a-Restated.

ANALOG DEVICES
Three Months Ended Feb. 2

	1974	1973
Shr Ernd	$.30	$.22
Revenue	6,702,439	4,553,538
Earnings	399,443	293,454

COMPUTER MACHINERY
Year Ended Dec. 31

	1973	1972
Shr Ernd	$.60	.....
Revenue	52,769,000	$29,616,000
aSpec Cred	552,000	168,000
Earnings	3,018,000	(1,955,000)

a-In 1973, credit less loss from cumulative effect of writing off deferred marketing costs of 1972 and prior years; in 1972, gain on sale of securities.

MICRODATA
Three Months Ended Feb. 28

	1974	1973
Shr Ernd	$.20	$.17
Revenue	3,182,538	2,251,028
Tax Cred	148,800	136,000
Earnings	309,900	283,985
6 Mo Shr	.35	.35
Revenue	5,718,247	4,232,487
Tax Cred	257,800	245,000
Earnings	550,500	522,565

QUOTRON SYSTEMS
Year Ended Dec. 31

	1973	1972
Shr Ernd	$.01	.....
Revenue	17,953,493	$8,906,303
aSpec Cred	8,000	357,128
Earnings	27,028	(2,956,334)

a-In 1973, tax credit; in 1972, gain on dispostion of discontinued operation.

GRAPHIC CONTROLS
Year Ended Dec. 31

	1973	1972
Shr Ernd	$1.63	$1.30
Revenue	30,663,954	25,194,134
Earnings	1,352,555	1,093,067

INFORMATION MAGNETICS
Year Ended Dec. 29

	1973	1972
Shr Ernd	$.55	$.21
Revenue	19,278,530	5,805,938
Earnings	709,363	232,092

COMPUTER TRANSCEIVER
Nine Months Ended Nov. 30

	1973	1972
Shr Ernd	$.29	$.11
Revenue	2,943,700	1,959,000
Tax Cred	118,200	42,500
Earnings	257,700	100,000

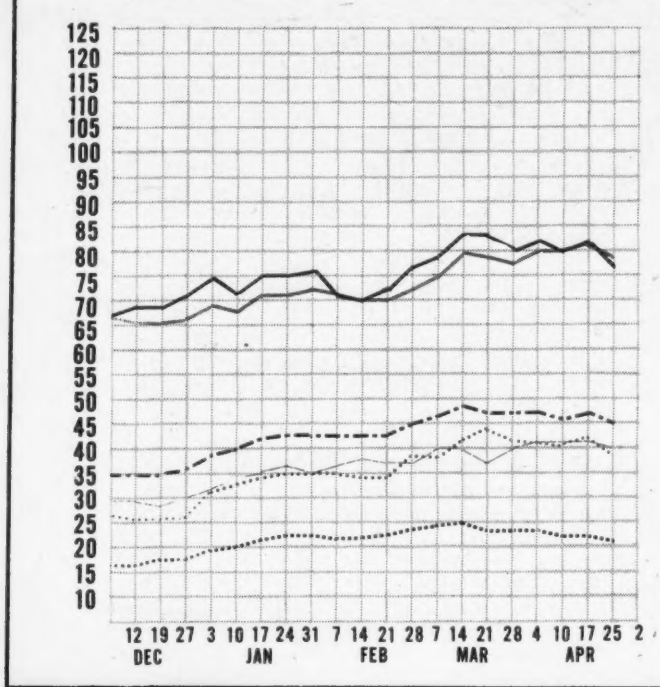
GRI COMPUTER
Six Months Ended Oct. 31

	1973	1972
Shr Ernd	$.06	$(.19)
Revenue	1,477,253	635,000
Tax Cred	75,825	.....
Earnings	137,549	(366,682)

TUCSON DATA CENTER
Year Ended Oct. 31

	1973	1972
Shr Ernd	$.32	$.25
Revenue	557,613	486,445
Earnings	42,096	33,440

COMPUTERWORLD Computer Stocks Trading Indexes



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TRADE*QUOTES

Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

EXCH		1973-74 RANGE (1)	CLOSE APR 25 1974	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	175-252	191 1/2	-11 1/2	-5.6
N	COLLINS RADIO	16- 26	24 3/4	0	0.0
O	COMPUTER AUTOMATION	5- 20	10 1/4	- 7/8	-7.8
N	CONTROL DATA CORP	30- 62	30 1/4	-3	-9.0
N	DATA GENERAL CORP	28- 49	32	-3	-8.5
O	DATAPOINT CORP	10- 21	11 3/4	-1 1/2	-11.3
O	DIGITAL COMP CONTROL	2- 6	3 7/8	+ 1/4	+6.8
N	DIGITAL EQUIPMENT	73-121	103 3/4	-6 3/8	-5.7
N	ELECTRONIC ASSOC.	2- 9	2 3/8	- 1/4	-9.5
A	ELECTRONIC ENGINEER.	6- 14	9 7/8	- 1/2	-4.8
N	FOXBORO	23- 48	34	-2	-5.5
O	GENERAL AUTOMATION	22- 55	32	-4	-11.1
O	GRI COMPUTER CORP	1- 3	1 3/8	+ 1/8	+10.0
N	HEWLETT-PACKARD CO	70- 99	79 1/4	-6 3/8	-7.4
N	HONEYWELL INC	68-139	75 1/2	- 1/4	-0.3
N	IBM	222-340	221 5/8	-12 5/8	-5.3
O	INTERDATA INC	7- 22	17	-4 1/4	-20.0
O	MICRODATA CORP	2- 10	3 1/2	0	0.0
N	NCR	27- 46	36 1/2	- 7/8	-2.3
N	RAYTHEON CO	22- 39	32 1/2	-3 1/2	-9.7
N	SINGER CO	32- 74	31 1/2	-1 1/4	-3.8
N	SPERRY RAND	36- 56	38 5/8	-1 1/2	-3.7
A	SYSTEMS ENG. LABS	1- 8	1 7/8	0	0.0
N	TEXAS INSTRUMENTS	83-138	98 3/8	+2 1/8	+2.2
O	ULTIMACC SYSTEMS INC	1- 11	1 1/4	0	0.0
N	VARIAN ASSOCIATES	10- 20	10	- 3/8	-3.6
N	WANG LABS.	13- 34	14 1/8	-1 1/4	-8.1
N	XEROX CORP	106-169	109	-8 1/2	-7.2
	LEASING COMPANIES				
A	BOOTHE COMPUTER	1- 5	1 1/8	0	0.0
O	BRESNAHAN COMP.	1- 2	2 1/8	0	0.0
O	COMDISCO INC	4- 17	4 1/4	- 1/2	-10.5
O	COMMERCE GROUP CORP	3- 6	5 1/4	- 1/8	-2.3
O	COMPUTER EXCHANGE	1- 1	1/4	0	0.0
A	COMPUTER INVSTRS GRP	2- 8	2	- 1/8	-5.8
O	COMP. INSTALLATIONS	1- 2	1 1/8	0	0.0
M	DATRONIC RENTAL	1- 3	1 3/4	0	0.0
A	DCL INC	0- 3	3/8	- 1/8	-29.9
N	DPF INC	3- 9	3 1/2	- 1/8	-3.4
O	EDP RESOURCES	1- 3	3 1/4	0	0.0
A	GRANITE MGT	2- 6	2	0	0.0
A	GREYHOUND COMPUTER	3- 6	3 5/8	- 1/4	-6.4
A	ITEL	4- 12	4 7/8	- 3/8	-7.1
N	LEASCO CORP	8- 18	9 3/4	- 3/4	-7.1
O	LEASPAC CORP	1- 8	1 1/4	+ 1/8	+11.1
O	LECTRO MGT INC	1- 2	3/8	- 3/8	-50.0
O	NRG INC	3- 15	3 1/2	+ 1/8	+3.7
A	PIONEER TEX CORP	3- 10	3 3/8	- 3/8	-10.0
A	ROCKWOOD COMPUTER	1- 3	7/8	0	0.0
N	U.S. LEASING	16- 36	17	-2	-10.5

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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EXCH		1973-74 RANGE (1)	CLOSE APR 25 1974	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	1 1/8	0	0.0
A	APPLIED DATA RES.	2- 4	3	+ 5/8	+26.3
O	APPLIED LOGIC	1- 3	3/8	0	0.0
N	AUTOMATIC DATA PROC	39- 94	39 3/4	-7 5/8	-16.0
O	BRANDON APPLIED SYST	1- 1	1/4	0	0.0
O	CENTRAL DATA SYSTEMS	3- 9	3 1/2	0	0.0
O	COMPUTER DIMENSIONS	1- 5	2	0	0.0
O	COMPUTER HORIZONS	1- 6	3 1/2	0	0.0
O	COMPUTER NETWORK	1- 5	1 1/2	0	0.0
N	COMPUTER SCIENCES	2- 6	2 3/4	- 1/2	-15.3
O	COMPUTER TASK GROUP	1- 2	1/2	0	0.0
O	COMPUTER TECHNOLOGY	1- 3	1/2	0	0.0
O	COMPUTER USAGE	3- 9	3 1/4	- 1/4	-7.1
O	COMRESS	1- 2	3/8	- 1/8	-25.0
O	COMSHARE	2- 9	2 3/4	0	0.0
N	CORDURA CORP	2- 15	2 3/8	- 1/8	-5.0
O	DATATAB	1- 4	1 3/8	0	0.0
A	ELECT COMP PROG	1- 2	1/4	0	0.0
N	ELECTRONIC DATA SYS.	12- 56	14 1/4	0	0.0
O	INFONATIONAL INC	1- 2	1/2	0	0.0
O	INFORMATICS	2- 7	6 3/4	0	0.0
O	I.O.A. DATA CORP	1- 1	3/8	0	0.0
O	IPS COMPUTER MARKET.	1- 5	1	0	0.0
O	KEANE ASSOCIATES	2- 5	3 1/2	- 1/4	-6.6
O	KEYDATA CORP	4- 12	4 1/4	- 1/4	-5.5
O	LOGICON	2- 7	3 3/8	- 1/4	-6.8
A	MANAGEMENT DATA	1- 5	1 3/8	- 1/8	-8.3
O	NATIONAL CSS INC	18- 42	26 1/2	-1 1/2	-5.3
O	NATIONAL COMPUTER CO	1- 1	1/2	0	0.0
O	NATIONAL INFO SRVCS	1- 2	1/8	0	0.0
P	ON LINE SYSTEMS INC	12- 29	25 1/8	- 7/8	-3.3
N	PLANNING RESEARCH	2- 7	2 3/4	+ 1/8	+4.7
O	PROGRAMMING METHODS	17- 25	17	0	0.0
O	PROGRAMMING & SYS	1- 1	1 1/8	0	0.0
O	RAPIDATA INC	2- 24	2 7/8	- 1/4	-8.0
O	SCIENTIFIC COMPUTERS	1- 3	7/8	- 1/8	-12.5
O	SIMPLICITY COMPUTER	1- 4	1	0	0.0
O	TCC INC	1- 1	3/8	0	0.0
O	TYMSHARE INC	6- 13	10 1/2	+ 5/8	+6.3
O	UNITED DATA CENTER	3- 6	3 1/4	- 1/4	-7.1
A	URS SYSTEMS	2- 8	2 7/8	- 1/2	-14.8
N	WYLY CORP	3- 11	3 1/2	0	0.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	8- 34	7 3/4	- 7/8	-10.1
O	ADVANCED MEMORY SYS	4- 23	3 3/4	-1	-21.0
N	AMPEX CORP	3- 7	3 5/8	- 1/8	-3.3
O	ANDERSON JACOBSON	2- 6	2 1/2	- 1/4	-9.0
O	BEEHIVE MEDICAL ELEC	4- 10	4 1/4	- 1/4	-5.5
A	BOLT,BERANEK & NEW	6- 12	7 1/4	- 1/4	-3.3
N	BUNKER-RAMO	6- 18	6 1/2	- 3/8	-5.4
A	CALCOMP	5- 16	9 5/8	- 3/4	-7.2
O	CAMBRIDGE MEMORIES	8- 17	10	- 3/8	-3.6
O	CENTRONICS DATA COMP	13- 38	19	-1 3/4	-8.4
O	CODEX CORP	8- 19	11 1/4	- 3/4	-6.2
O	COGNITRONICS	1- 3	1 1/8	+ 3/8	+50.0

EXCH		1973-74 RANGE (1)	CLOSE APR 25 1974	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMPUTER COMMUN.	1- 4	3/4	- 1/8	-14.2
A	COMPUTER EQUIPMENT	1- 3	1 1/2	0	0.0
O	COMPUTER MACHINERY	4- 13	3 3/4	- 1/4	-6.2
O	COMPUTER TRANSCEIVER	1- 6	1 1/4	+ 1/8	+11.1
N	CONRAC CORP	13- 32	17 3/4	-2 3/4	-13.4
O	DATA ACCESS SYSTEMS	1- 3	2	0	0.0
O	DATA 100	9- 19	9 1/2	-1 1/2	-13.6
A	DATA PRODUCTS CORP	2- 5	3 5/8	- 3/8	-9.3
O	DATA RECOGNITION	1- 3	1/2	0	0.0
O	DATA TECHNOLOGY	1- 5	3 1/4	0	0.0
O	DECISION DATA COMPUT	6- 40	7 1/2	-2 1/8	-22.0
O	DELTA DATA SYSTEMS	1- 1	3/4	- 1/8	-14.2
O	DI/AN CONTROLS	1- 4	1 1/4	- 1/4	-16.6
N	ELECTRONIC M & M	3- 6	3	- 1/4	-7.6
O	FABRI-TEK	2- 5	2 1/4	- 1/4	-10.0
O	GENERAL COMPUTER SYS	3- 9	2 3/4	0	0.0
N	GENERAL ELECTRIC	51- 76	52	-2 3/4	-5.0
N	HAZELTINE CORP	4- 9	4 1/2	- 3/4	-14.2
O	INFOREX INC	2- 23	2 1/2	- 1/8	-4.7
O	INFORMATION DISPLAYS	1- 2	1/4	- 1/8	-33.3
O	INFORMATION INTL INC	8- 15	9 3/4	- 3/4	-7.1
A	LUNDY ELECTRONICS	3- 9	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	1/4	0	0.0
N	MEMOREX	2- 19	4 3/8	+ 1/2	+12.9
A	MILGO ELECTRONICS	14- 28	13 3/4	-1 1/2	-9.8
N	MOHAWK DATA SCI	2- 13	3	- 1/2	-14.2
O	ODEC COMPUTER SYST.	2- 6	1 3/4	- 1/4	-12.5
O	OPTICAL SCANNING	2- 8	3 5/8	0	0.0
O	PERTEC CORP	3- 8	3 3/8	- 1/4	-6.8
O	PHOTON	3- 7	3 3/4	0	0.0
A	POTTER INSTRUMENT	2- 9	3 1/8	0	0.0
O	PRECISION INST.	2- 6	1 1/2	0	0.0
O	QUANTOR CORP	4- 10	6	- 1/2	-7.6
O	RECOGNITION EQUIP	2- 8	3 1/4	- 1/4	-7.1
N	SANDERS ASSOCIATES	5- 18	4 3/4	- 3/4	-13.6
O	SCAN DATA	1- 6	1 7/8	- 1/8	-6.2
O	STORAGE TECHNOLOGY	11- 34	10 3/4	-2 3/8	-18.0
O	SYCOR INC	8- 20	8 1/4	- 1/2	-5.7
O	TALLY CORP.	2- 14	3 3/4	- 1/8	-3.2
O	TEC INC	5- 9	4 3/4	- 3/4	-13.6
N	TEKTRONIX INC	30- 55	39 5/8	-1 3/8	-3.3
N	TELEX	3- 8	2 1/2	- 1/8	-4.7
O	WANGCO INC	7- 13	12	0	0.0
O	WILTEK INC	6- 18	6	+ 1/4	+4.3
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	4- 9	5 3/4	0	0.0
A	BARRY WRIGHT	5- 13	6 5/8	0	0.0
O	CYBERNATICS INC	1- 3	1 1/4	0	0.0
A	DATA DOCUMENTS	17- 44	41 1/4	+1	+2.4
O	DUPLEX PRODUCTS INC	6- 10	8 3/8	- 3/8	-4.2
N	ENNIS BUS. FORMS	5- 8	6 1/2	0	0.0
O	GRAHAM MAGNETICS	7- 20	8	-1 1/4	-13.5
O	GRAPHIC CONTROLS	7- 12	9 3/4	- 1/2	-4.8
N	3M COMPANY	69- 91	71 1/4	-4	-5.3
O	MOORE CORP LTD	48- 65	47 3/4	-1	-2.0
N	NASHUA CORP	34- 58	33 7/8	-2 1/8	-5.9
O	REYNOLDS & REYNOLD	25- 51	25 1/4	-1 1/2	-5.6
O	STANDARD REGISTER	11- 20	15	- 1/2	-3.2
O	TAB PRODUCTS CO	7- 23	9 1/2	-1	-9.5
N	UARCO	15- 23	19 1/2	- 3/8	-1.8
A	WABASH MAGNETICS	5- 8	5 7/8	- 1/4	-4.0
N	WALLACE BUS FORMS	14- 26	19 3/8	+ 1/8	+0.6

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